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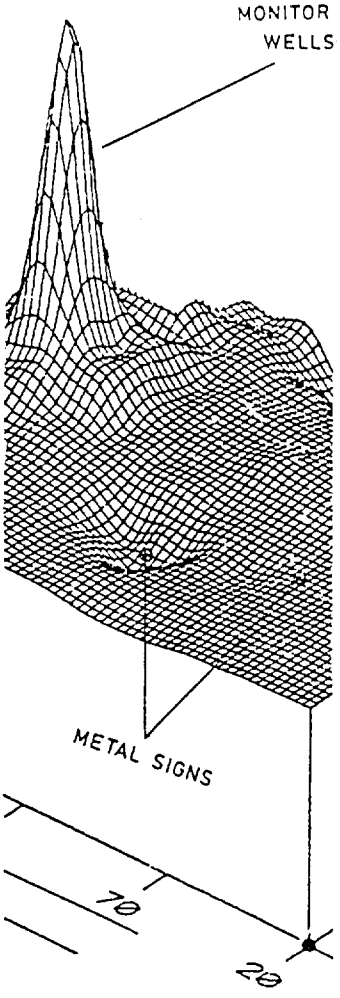
SUBSURFACE CONDITIONS AT SITE 16 LONE STAR ARMY AMMUNITION PLANT, TEXAS

by

Richard J. Lutton, Jerald D. Broughton, Donald E. Yule
Michael K. Sharp, Roy Wade

Geotechnical Laboratory

DEPARTMENT OF THE ARMY
Waterways Experiment Station, Corps of Engineers
PO Box 631, Vicksburg, Mississippi 39181-0631



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Site 16 was investigated with subsurface borings to establish the geological setting and to evaluate the possible presence of buried waste and contaminated ground water. Magnetic and conductivity surveys suggested only one unexplained weak anomaly within an area of possible waste burial in the past. Three new monitoring wells together with two placed in 1981 surround the suspect area on the down-gradient side. Analysis of water samples taken one month and two months after installation of these wells revealed no parameters exceeding Federal primary drinking water standards. The concentration of chromium in the ground water is substantially lower than previously reported. The site is considered to be free of serious contamination. (FK)

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PREFACE

Field and laboratory investigations were conducted by the US Army Engineer Waterways Experiment Station (WES) on the Lone Star Army Ammunition Plant (LSAAP), Texarkana, Texas, from March through August 1988. The Geotechnical Laboratory (GL) undertook this work for the US Army Engineer Toxic and Hazardous Materials Agency (THAMA) to assess subsurface conditions and possible need for remediation at Site 16. Field work consisted of geophysical surveys by the Earthquake Engineering and Geophysics Division (EEGD) in March, subsurface investigations and installation of monitoring wells by the Engineering Geology and Rock Mechanics Division (EGRMD) in June, and sampling of ground water by the Environmental Engineering Division (EED) of the Environmental Laboratory, WES in July and August. Chemical analyses were performed by Environmental Science and Engineering Inc. (ESE), Gainesville, Florida, working under contract to THAMA.

This report was prepared by Dr. R. J. Lutton, EGRMD, who also served as principal investigator. Part II on geophysics summarizes a file report prepared by Messrs. D. E. Yule and M. K. Sharp, EEGD included as an appendix. The description of water sampling in Part VI is based on trip reports by Mr. Roy Wade, EED, and the tabulated chemistry of ground water came from ESE through THAMA. Mr. J. D. Broughton, EGRMD, contributed to the study through familiarity with contamination at LSAAP and the needs and protocol of the THAMA. General supervision was provided by Drs. D. C. Banks, Chief, EGRMD, and W. F. Marcuson III, Chief, GL.

COL Dwayne G. Lee, EN, was Commander and Director of WES during preparation and publication of this report. Dr. Robert W. Whalin was Technical Director.

CONTENTS

CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
acres	4,046.873	square metres
degrees (angle)	0.01745329	radians
feet	0.3048	metres
inches	2.54	centimetres
miles (US statute)	1.609347	kilometres
pounds (mass)	0.4535924	kilograms
gallons	3.785412	cubic decimetres

SUBSURFACE CONDITIONS AT SITE 16 LONE STAR ARMY AMMUNITION PLANT, TEXAS

PART I: INTRODUCTION

Purpose

1. This study was conducted to assess the subsurface conditions at Site 16 at the Lone Star Army Ammunition Plant (LSAAP) and to determine quantitatively the presence or absence of trace contaminants in the ground water. The findings are intended to support the determination of whether any further investigation or remediation is required.

Scope

2. The investigation was conducted in 1988 on Site 16, henceforth called the chemical burial site (CBS). The CBS (Figure 1) was previously excluded from the comprehensive LSAAP-wide remedial investigation for the US Army Engineer Toxic and Hazardous Materials Agency (THAMA) underway at the time.* The criteria for evaluating the site in terms of the condition of its ground water are the Primary Drinking Water Standards promulgated by the Environmental Protection Agency (EPA).

3. To pinpoint the burial location, geophysical surveys were conducted in April 1988 for anomalies indicating buried waste or waste containers. These surveys revealed no definitive location and it seemed possible the report of disposal activities at this site* was incorrect. To aid in the final decision concerning this site, three monitoring wells were added in June to the two already in place to surround the CBS. Geological information was obtained by logging and sampling the soils. The geological setting was developed from the logs and results of a soil testing program. Water samples were obtained from the five monitoring wells approximately one month after installation was completed, and a second set of samples was taken one month

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* Dames and Moore, 1987, "Remedial Investigation/Feasibility Study. Technical Plan. Lone Star Army Ammunition Plant, Texarkana, Texas," Bethesda, Maryland.

later in August 1988. Finally, this report has been prepared to summarize field work and methods, geological and ground-water setting, geophysical surveys, results of chemical analyses conducted by others, and conclusions on the presence of waste and migration of contamination in the ground water.

Background

4. The technical plan for remedial investigation (paragraph 2), although not including CBS, briefly summarized the conditions and history there as follows. Approximately fifty 55-gal drums of sulfuric acid, chromic acid, and industrial organics are said to have been buried at this site between 1950 and 1970. Wells 24 and 25 were installed in 1981. Chromium was detected in well 25 at a concentration above EPA criteria shortly after well installation. No other exceedances have been reported at this site. Wells 24 and 25 have been monitored semiannually. The current LSAAP monitoring program also includes a surface water sampling station down-gradient at the boundary of LSAAP. Soils at this site are characterized as sands and clays. Ground water flows south-southeast.

PART II: GEOPHYSICAL SURVEYS

Field Methods

5. Two geophysical methods were employed - a magnetic survey and a conductivity survey. A 20-ft × 20-ft measurement grid was established and additional measurements were made on a 10-ft × 10-ft grid around anomalous regions.

6. The magnetic survey measured total magnetic field strength using a proton precession magnetometer. A base station was established and was reoccupied after every profile line. For additional information, see Appendix A.

7. The conductivity survey used an electromagnetic induction (EM) terrain conductivity system. The particular instrument has a receiver and transmitter located at opposite ends of a 13-ft boom. The effective depth for this instrument is 19 ft. A thorough investigation was possible to a depth of 13 ft, but anomalies are increasingly difficult to distinguish below that depth.

Results

8. The results of analysis of geophysical data at CBS are presented in Figures 2 through 5 as both contour maps and block diagrams. Additional explanation is given in Appendix A.

9. The magnetic field (Figures 2 and 3) is dominated by anomalies from two metal warning signs and from monitoring wells 24 and 25. One unexplained positive 60-gamma anomaly is annotated in the figures. The 20-ft width of this anomaly might be interpreted as indicating a feature buried at 20 ft.

10. The conductivity survey (Figures 4 and 5) was not as affected by the metal posts and wells because of the orientation of the measurement field and the distances these features were from measurement points. Thin vertical conductive features located on either side of the instrument have only small effects at a few feet offset. Overall, the conductivity survey revealed a uniform site with no anomalies.

PART III: SUBSURFACE EXPLORATION AND MONITORING WELLS

Equipment Preparation

11. Subsurface work was accomplished with a truck-mounted rotary drill rig owned and operated by the Memphis District Corps of Engineers. For two months prior to working at LSAAP, the drill rig had been used in routine geotechnical investigations at the Slack Water Harbor project located near Helena, Arkansas. The last environmental investigation involving likely exposure to hazardous waste was almost two years previously in an investigation for the City of Memphis at the Walnut Grove landfill. Subsequently to the landfill investigation, the rig was steam cleaned.

12. Prior to entering the CBS, the drill crew took several precautions to avoid importing material from off-site areas. First, the rig and supporting pickup truck and 500-gal water tank were cleaned at the LSAAP motor pool. Steam cleaning equipment was tried first, but it was found that a higher volume and pressure achievable by bypassing the heater was more effective in removing the accumulated soil and grease. Accordingly, the rig was washed three hours with heavy duty hose and nozzle and another 1-1/2 hrs with cleaning wand at higher pressure. The pickup truck and water truck took about 2 hrs to clean using the same general procedure.

13. The interior of the water tank was flushed by filling and emptying twice with water from a source approved by THAMA. This source is the surface reservoir located at 8,800 ft north northeast of CBS.

14. The rig was driven to the CBS and cleaned again to remove new foreign material picked up enroute and lodged on and around the tires. This cleaning with hose, nozzle, and brush took only about 20 min. The rig was then backed onto the site and over the desired location to begin drilling. The box auger bit and drill pipes had been cleaned as indicated above at the motor pool and they were cleaned lightly again before entering the site. The pickup truck carrying the water tank was kept at least 15 ft away from the hole collar to avoid the necessity for cleaning after each trip off site for water.

Augering and Sampling Soil

15. The same drilling and sampling procedure was used for all three new wells (CBS-1, -2, and -3) except that drilling mud was needed in hole CBS-3 to stabilize and preserve the bottom of the hole for well installation. A 7-1/2-in box auger was used to advance the holes and recover disturbed samples continuously foot by foot. By deepening in 1-ft increments, close observations could be made to distinguish soil types and changes. Logging amounted to describing the soil in each 1-ft increment. Where contacts between soil types could be recognized, these depths were logged. Logs of CBS-1, -2, and -3 are shown in Figures 6 through 8 and their locations in Figure 1. Strata in wells 24 and 25 are summarized in Figure 9 prepared from LSAAP records.

16. A box auger bit shaves, spirals, and mixes the cutting so that details such as thin bedding are largely lost. Nevertheless, contrasting materials could be distinguished such as the thin lenses of loose sand evident in fat clay at depths of about 16 ft in CBS-2. Soils were described generally in accordance with the THAMA requirements.

17. The average spacing for retained samples was about 3 ft. These samples were taken from the bottom of the box auger bit where recovered soil tended to be cleaner and more representative of the new interval.

18. It was necessary to use drilling mud in CBS-3 to auger the final 6 ft and to keep the hole open while the well was installed. The last sample was recovered at 27 to 28 ft. The auger recovered only traces of cohesionless fine sand between 28 and 29 ft. The decision was then made to save the well at this important location by using drilling mud. No sampling was attempted from the interval 28 to 34 ft.

19. A thin drilling mud was prepared by mixing the bentonite powder identified in Table 1 with the water from the approved source (paragraph 13). The hole was completed from 29 to 34 ft using the mud and a fish-tail bit. Then clean water was circulated to the bottom to lift cuttings and much of the drilling mud to the hole collar and out onto the ground surface. Return water at the end of the circulation operation remained heavily clouded. The well screen and casing were then installed quickly.

Installing Wells

20. The installation and construction of the three new monitoring wells (Figure 10) followed guidance promulgated by THAMA. Upon reaching a depth approximately 10 ft below the top of saturation as revealed during augering, and otherwise compatible with the guidance, the PVC screen and casing were placed directly on the bottom and the well was constructed.

21. Materials and other construction details of each well are illustrated in Figure 10 and in Table 1. Sand was dropped around the screen through a tremie composed of a 1-1/4-in PVC pipe and a galvanized funnel. The sand pack was allowed to stabilize about 30 min. The well seal was constructed by dropping bentonite pellets, again through the tremie pipe to avoid formation of bridged cavities. The seal was wetted and left for approximately 60 min.

22. The hole was grouted from the stabilized seal to the surface. The grout mixture was 5 gal of water and 5 lb bentonite per 94-lb bag of portland cement. Two or three bags of cement (Table 1) were needed in each hole. Fresh grout was circulated through the pump on the drill rig until mixed well and then was injected at a depth near the top of the seal and allowed to rise and overflow at the surface. A steel guard with locking cap was set over the PVC casing collar and into the grout for protection. Additional grout was placed to finish the outside and in the space between the guard and well casing.

23. The detail of previously existing wells 24 and 25 are shown in Figure 11 prepared from LSAAP records. Table 2 presents well locations.

Developing Wells

24. The wells were developed by removing five volumes of water as expected by THAMA. Basic well volume occupies that portion of the casing and sand-filled annulus between the bottom of the hole and the water table. It was assumed that the porosity in the sand pack was 33 percent. Volumes actually removed from CBS-1, -2, and -3 were 125, 125, and 125 gal, exceeding the five volumes calculated as 93, 62, and 55 gal, respectively. CBS-3 filled no faster than 17 gal/hr and required 10 hrs to develop. Considerable black silt and fine sand was recovered during the first 5 hrs and the water

remained cloudy throughout development. Holes CBS-1 and -2 were developed in less than three hours each although water did not clear.

Diesel Spill

25. A small amount of diesel fuel was spilled on June 5 and 6. Spillage occurred after the drill rig left hole CBS-3 but was parked overnight on sloping ground nearby. Tilting the tank along with the rest of the rig allowed an estimated 5 gal of fuel to spill through an ungasketed cap. The spill was discovered upon returning to work and four empty cement sacks were filled with oil-soaked soil and removed from the site. Visual indications are that some of the spill remains in place or has moved downward. The position of the spill is 20 ft northeast of CBS-3. The water table is separated vertically from the spill by two clay layers, and it is doubtful that diesel fuel would reach the well intakes.

PART IV: GEOLOGICAL SETTING

Regional Structure

26. One of the earliest geological features of the Gulf Coastal Plain is the Sabine uplift - a relatively flat-topped uplift centered in northwestern Louisiana.* Approximately 80 miles long and 65 miles wide, the uplift is flanked on the east by the North Louisiana syncline and on the west by the East Texas syncline (Figure 12). Structural development of this region began in the western part, probably during Jurassic times, and progressed eastward during Cretaceous and Early Tertiary times. The Sabine uplift region has been structurally stable since the Early Eocene.

27. The East Texas syncline follows the arc of the Ouachita fold belt and is apparently structurally related to the ancient geosyncline. Sediments have been deposited since Late Cretaceous times; however, marine sediments are absent in the Late Eocene and younger strata throughout the embayment, suggesting reflexive uplift in response to the progressive downwarping of the Gulf Coast geosyncline to the southeast. Numerous salt domes and other salt-controlled structural features are found cutting through the sediments in the embayment, but no large-scale faulting has been noted in the basin proper affecting Late Eocene strata.

28. It should be understood that the apparent absence of post-Eocene faults is a tentative characterization at best, based more on lack of clear exposures and subsurface data than on incontrovertable evidence. In fact, the Corps of Engineers exploration borings* at the Texarkana dam (Wright Patman dam) 7 miles southeast of LSAAP were first interpreted as crossing a set of faults trending eastward along the valley but subsequently were reinterpreted as inconclusive of any faults at all. Regardless, such regional interpretations are largely inconsequential to the characterization of CBS, except as discussed later in paragraph 32.

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* US Army Engineer Waterways Experiment Station, 1949, "Texarkana Dam, Foundation and Borrow Area Investigation and Embankment Design," Technical Memorandum 3-293, Vicksburg, Mississippi, and US Army Engineer Waterways Experiment Station, 1958, "Review of Soils Design, Construction, and Prototype Observations, Texarkana Dam, Texas," Technical Report 3-484, Vicksburg, Mississippi.

Stratigraphy

29. The LSAAP occupies gently rolling hilly country between the valleys of the Red River and Sulphur River. Geological strata surfacing in the vicinity of LSAAP are mostly either Early Tertiary or Quaternary in age. Early Tertiary formations were deposited in both marine and non-marine environments and are integrally related to the structural setting described above and illustrated in Figure 12. These beds slope south-southeast about 50 ft/mile into the East Texas syncline. The Midway sediments are mainly dark clay with limestone near the base, all characteristic of near-shore marine waters or tidal flats around river mouths. The overlying Wilcox sediments consist mainly of interbedded sand and clay. Included lignite beds and occasional pieces of petrified wood reflect the near-shore and flood plain environments. CBS is considered to be underlain by Wilcox strata at the surface with Midway clay starting at a depth of several tens of feet.

30. Quaternary strata formed much later in association with river systems generally near the present rivers. These young riverine strata are flat-lying and unaffected by the previous structural history of the region, but the complexities of riverine environments make correlations of beds largely conjectural and potentially misleading. Generally the Quaternary may be separated into high-lying Pleistocene terrace deposits and low-lying Holocene valley deposits.

31. Remnants of terrace deposits are indicated in the vicinity of CBS by the presence of streaks of gravel at the ground surface as a residual or lag deposit. Elsewhere, terrace deposits can be thick and are said to be coarser in grain size than the Wilcox sediments.

Site Geology

32. Subsurface investigations have revealed the CBS to be complex well beyond what might have been expected (Figure 13). Strata can be correlated with confidence across the northern half of the site but not into the southern portion, yet the site measures only 200 ft across. Superimposition of an even more conspicuous discontinuity in the level of the water table, discussed later in paragraph 37, has supported the stratigraphic discontinuity as realistic.

33. Figure 13 shows the generalized subsurface materials along a section connecting the five borings at the perimeter of the site. Wells CBS-1 and -2 and 25 are located north of the discontinuity, whereas 24 and CBS-3 are to the south. Except for the gravelly soil at the surface, the strata are dominated by beds of clay and of silty fine sand. This bimodal characterization of soils at CBS is supported by the results of laboratory testing presented in Appendix B. The clay layers are relatively clean and highly plastic whereas other layers are dominated by fine sand or silt. Notice the lignite in well 24 and the corresponding silty black clay in CBS-3. For logging details, refer to Figures 6 through 9.

34. Possibilities considered to explain the apparent stratigraphic discontinuity passing through CBS were as follows:

a. A normal fault, probably with north side down.

b. A steep Pleistocene channel boundary between terrace fill on the north and eroded Wilcox beds on the south.

c. A Wilcox depositional feature such as a thick clay lens.

None of these explanations seems fully acceptable or appropriate.

35. The intercepts of three surfaces with borings were analyzed to establish any inclination for comparison to regional strike and dip. This analysis was only attempted with logs from wells CBS-1 and -2 and 25 located north of the discontinuity. The beds were the upper clay, the second clay, and the clean sand at about 24 ft depth. The results are as follows:

Bed	Strike (deg)	Dip (SE)
First clay (base)	N 71° E	5.2 percent (3°)
Second clay (top)	N 68° E	5.3 percent (3°)
Clean sand (top)	N 27° E	2.1 percent (1°)

These inclinations are greater than, but still quite compatible with, the south-southeasterly inclinations recognized elsewhere in the vicinity of LSAAP (paragraph 29). Inclined beds tend to support the interpretation of strata at CBS as Early Tertiary rather than Quaternary (paragraph 30) and make the second interpretation in paragraph 34 somewhat less plausible.

PART V: GEOHYDROLOGY

Regional Ground Water

36. Interest in this study is focused on the uppermost, unconfined aquifer to reveal evidence of contaminants released from any burial site. Although a broad generalization can be made about a northward flow to the Red River on the north side of LSAAP and a southward flow to the Sulphur River on the south side (around CBS), the pattern is actually much more reflective of local topography than of any regional trend. This local control is evident at sites approximately 2,000 and 7,600 ft due north of CBS. Gradients on the water table there are southeastward and generally in accordance with the surface water drainage trends into East Fork Elliott Creek. A similar relationship but with flow to the west is evident 4 miles northwest of CBS at the western sanitary landfill east of Caney Creek according to the LSAAP remedial investigation plan (paragraph 2).

Site Ground Water

37. Figure 14 illustrates the configuration of the water table at CBS. As with the basic stratigraphy (paragraph 32), there is an east-west discontinuity separating a gently sloped portion over more than half the site from a southern portion at a conspicuously steeper slope.

38. In descending southeastward, the ground water loses more than 13 ft of head in a horizontal distance of only about 35 ft. No explanation of this surprising phenomenon is attempted except to emphasize that the high gradient is apparently real and related in some way to the geological setting as discussed in paragraph 32. Finally, note that monitoring well CBS-3 is in a key position for sampling ground water passing through the center of CBS. Sampling and testing of ground water is addressed in Part VI.

PART VI: GROUND-WATER CHEMISTRY

Sampling and Field Parameters

39. All five monitoring wells at CBS were sampled twice - one month and two months after installation of the three new wells. Water levels measured with M-scope before purging are listed in Tables 3 and 4. Prior to purging, the equipment was washed, first with acetone, then with 10-percent nitric acid, and finally three times with double distilled deionized water (DDI).

40. On July 11 and August 8, the five wells were purged with a well wizard pump or a bailer. Volumes removed are listed in Tables 3 and 4. Wells 24, 25, and CBS-3 were purged to dryness and yielded far less than the intended five volumes (paragraph 24) calculated to be 58, 121, and 55 gal, respectively.

41. On July 12 and August 9, about 12 hrs after purging, the five wells were sampled. Sampling equipment was first washed as in paragraph 39 above. Equipment included a teflon bailer, a teflon-coated cable used to lower the bailer into the well, and the M-scope to measure water levels. Sample containers sent to LSAAP by Environmental Science and Engineering Inc. (ESE), the chemical testing laboratory, included:

a. Ice chests.

b. 1-litre plastic cubic containers for metals.

c. 1-litre plastic cubic containers for sulfides.

d. 1-litre amber jars for extractables.

e. 60-millilitre amber jars for volatile organics.

f. Nitric acid for preserving metals.

g. Eye droppers for transferring acid to metal sample.

The volatiles were preserved by ESE at the laboratory.

42. Equipment rinse water blanks were collected by cleaning the teflon bailer, filtering the DDI from the bailer through a filter for the metal samples, filling 1-litre amber jars with DDI from the bailer for extractables and sulfides, and filling four 60-millilitre amber jars with DDI from the bailer for volatile organics. The samples for metals were filtered through a 0.45-micrometre filter. The pH, conductivity, temperature, and presampling water levels measured for each well are listed in Tables 5 and 6.

43. All wells recharged completely except number 24. This well did not recharge enough to allow all sample volumes to be collected, however, all samples except one 1-litre amber jar were collected from this well. The water from well 24 was very cloudy. Tables 5 and 6 show the information mentioned above as well as ESE labeling.

44. After the samples were collected, filtered, and preserved, they were packed in ice for shipping. A chain-of-custody sheet for all the samples was sealed in a plastic bag and placed in one of the ice chests. Each ice chest was sealed with two signed chain-of-custody seals. The samples were shipped from Texarkana on the same day as they were taken via overnight delivery to ESE. The samples arrived at the testing laboratory in good condition.

Chemical Analyses

45. Chemical analyses were conducted on the collected samples (paragraph 44) by ESE following THAMA protocol. Complete results of the 1988 analyses for all five wells and the rinse water blank are listed in Appendix C as Tables C1 through C6. Day and Zimmermann Inc., the contracted operator of LSAAP, has supplied the records of previous chemical analyses. Table C7 presents results for well 25 in 1982 and Tables C8 and C9 summarize subsequent semiannual monitoring (paragraph 4) of wells 24 and 25 from 1984 to 1988. Table 7 summarizes results above the limits of detection. Parameters found in amounts above the limits of detection in sampling from July 1988 were bis (2-ethylhexyl) phthalate, benzo (k) fluoranthene, and the metals lead, chromium, copper, and zinc. Note that no analytes were identified in the samples from August 1988.

46. The analytical results reveal a scarcity of volatile organics and metal analytes in the ground water at CBS, at least in the sense of contamination. Chromium caused the most concern in the past because the analyses in 1982 indicated an exceedance of the Primary Drinking Water Standards (50 uGL). Testing for this definitive study reveals that a much lower level prevails today (Table 7). In fact, results subsequent to 1985 are less than the limiting standard, and if there is a real trend for chromium abundance, it is a decreasing one.

PART VII: CONCLUSIONS

47. No surface or subsurface physical evidence was found to support the old report of burial of chemical waste at Site 16. Low concentrations of organics and metals detected in the water samples from five monitoring wells represent no threat to either the population or the environment. Further investigation and remedial action appear to be unnecessary.

Table 1

Well Construction Materials

Material	Purpose	Product and Source
Bentonite powder	Drilling mud	International SDG 330 International Minerals and Chemicals Corp. Mundelein, IL
Bentonite pellets	Seal	High Yield Western Bentonite Polymer Drilling Systems El Dorado, AR
Screened sand	Sand pack	CSSI Silica Sand, Texas Rescreened (No. 20-No. 40 screen) Colorado Silica Sand, Inc. Colorado Springs, CO
Cement	Grout	Foreman Cement, Type 2 Portland Arkansas Cement Corp. Little Rock, AR
Slotted pipe	Screen	Tri Loc Monitor Pipe, 4 ft × 10 in. PVC threaded, 0.010 ft slotted Brainard-Kilman Stone Mountain, GA
Plain pipe	Riser	Tri Loc Monitor Pipe, 4 ft × 10 in. PVC threaded, Brainard-Kilman Stone Mountain, GA
Plastic tape	Seal joints	Threadmaster Teflon, 3/4 ft Merco Company Hackensack, NJ
Cap, plug	Well ends	Threaded PVC M.M.R. Enterprises, Inc. Seagoville, TX

Table 2

Coordinates and Elevations in Monitoring Wells in Feet

	Coordinates		Ground	Top-of-Casing	Water Table Elevation		
	North	East	Elevation	Elevation	5 June	11 July	8 August
CBS-1	649,416	2,993,555	332.1	335.4	317.6	316.9	316.4
CBS-2	649,325	2,993,567	329.2	331.2	316.7	316.6	316.0
CBS-3	649,328	2,993,673	326.7	329.1	302.9	302.1	301.2
24*	649,306	2,993,635	--	330.6	303.5	301.2	301.2
25	649,387	2,993,680	--	328.6	316.7	311.2	310.7

* Previous coordinates and elevation for top of casing in well 24 were used as bases for other measurements.

Table 3

Well Purging Data for 11 July

Well Number	Casing Diam. in.	Water Level ft-in.	Volume Purged gal	Water Observation
CBS-1	4	18-6	75	Cloudy
CBS-2	4	14-7	50	Cloudy
CBS-3*	4	27-0	12.5	Cloudy
24*	2	29-5	2	Very cloudy
25*	2	17-5	7.5	Cloudy

* Well was purged dry.

Table 4

Well Purging Data for 8 August

Well Number	Casing Diam. in.	Water Level ft-in.	Volume Purged gal	Water Observation
CBS-1	4	19-0	75	Cloudy
CBS-2	4	15-2	50	Cloudy
CBS-3*	4	27-11	12	Cloudy
24*	2	29-5	2.5	Very cloudy
25*	2	17-11	8	Cloudy

* Well was purged dry.

Table 5

Well Sampling Data for 12 July

Well Number	ESE Number	Parameters	pH	Conductivity micromhos	Temperature °C	Water Level* ft-in.
CBS-1	CLSS13*1-N	Metals	5.2	50	27	19-5
	CLSS13*1-S	Sulfides				
	CLSS13*1-MS	Extractables				
	CLSS13*1-	Vol. organic				
CBS-2	CLSS13*2-N	Metals	5.4	25	25	14-9
	CLSS13*2-S	Sulfides				
	CLSS13*2-MS	Extractables				
	CLSS13*2-	Vol. organic				
CBS-3	CLSS13*6-N	Metals	6.7	25	27	27-0
	CLSS13*6-S	Sulfides				
	CLSS13*6-MS	Extractables				
	CLSS13*6-	Vol. organic				
24	CLSS13*5-N	Metals	6.3	90	26	35-7
	CLSS13*5-S	Sulfides				
	CLSS13*5-MS	Extractables				
	CLSS13*5-	Vol. organic				
25	CLSS13*4-N	Metals	5.7	30	27	17-0
	CLSS13*4-S	Sulfides				
	CLSS13*4-MS	Extractables				
	CLSS13*4-	Vol. organic				

* Depth from top of casing.

Table 6

Well Sampling Data for 9 August

Well Number	ESE Number	Parameters	pH	Conductivity micromhos	Temperature °C	Water Level* ft-in.
CBS-1	CLSS13*7-N	Metals	5.6	33	27	19-3
	CLSS13*7-S	Sulfides				
	CLSS13*7-MS	Extractables				
	CLSS13*7-	Vol. organic				
CBS-2	CLSS13*8-N	Metals	5.3	23	25	15-2
	CLSS13*8-S	Sulfides				
	CLSS13*8-MS	Extractables				
	CLSS13*8-	Vol. organic				
CBS-3	CLSS13*9-N	Metals	5.8	57	27	28-0
	CLSS13*9-S	Sulfides				
	CLSS13*9-MS	Extractables				
	CLSS13*9-	Vol. organic				
24	CLSS13*10-N	Metals	6.3	84	26	37-9
	CLSS13*10-S	Sulfides				
	CLSS13*10-MS	Extractables				
	CLSS13*10-	Vol. organic				
25	CLSS13*11-N	Metals	5.9	66	27	17-9
	CLSS13*11-S	Sulfides				
	CLSS13*11-MS	Extractables				
	CLSS13*11-	Vol. organic				

* Depth from top of casing.

Table 7

Analytes Indicated* in Water Samples

of July and August 1988

Sample Date	Well No.	Analyte	Concentration (uGL)
July	Blank**	Bis (2-ethylhexyl) phthalate	5.27
July	CBS-1	Lead	26.3
July	CBS-3	Bis (2-ethylhexyl) phthalate	25.5
July	24	Lead	30.1
		Chromium	14.9
		Chromium	14.9
		Chromium	14.9
		Copper	18.8
		Copper	18.8
		Copper	18.8
		Zinc	32.5
		Zinc	32.5
		Zinc	32.5
		Benzo (k) fluoranthene	0.98
		Bis (2-ethylhexyl) phthalate	5.09
July	25	Copper	14.7
		Copper	14.7
		Copper	14.7
		Bis (2-ethylhexyl) phthalate	6.18
August		No analytes above LT	---

* Excluding analytes not detected (ND) or indicated as less than (LT) the detection range.

** Equipment rinse water.

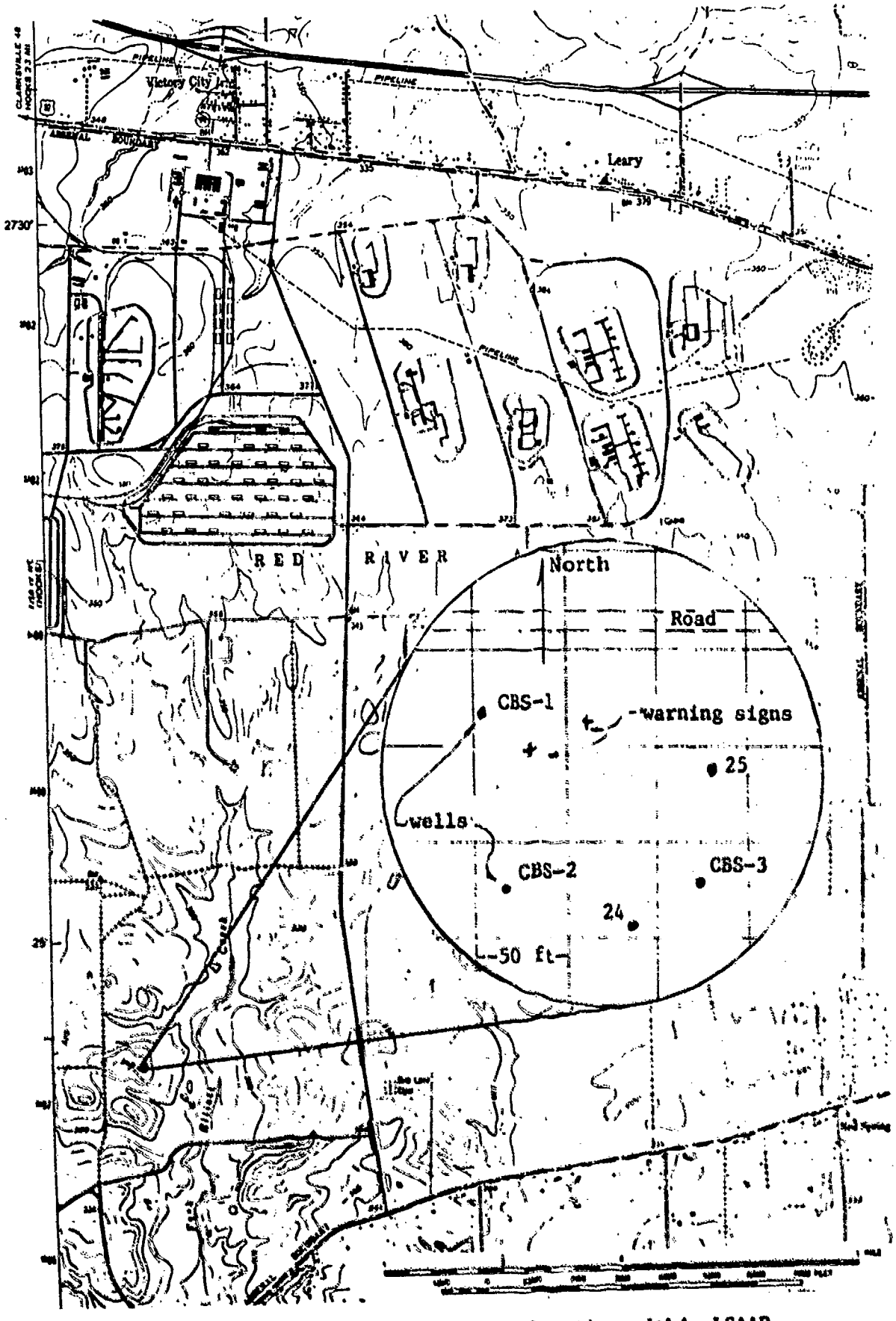


Figure 1. CBS (circled) and its location within LSAAP

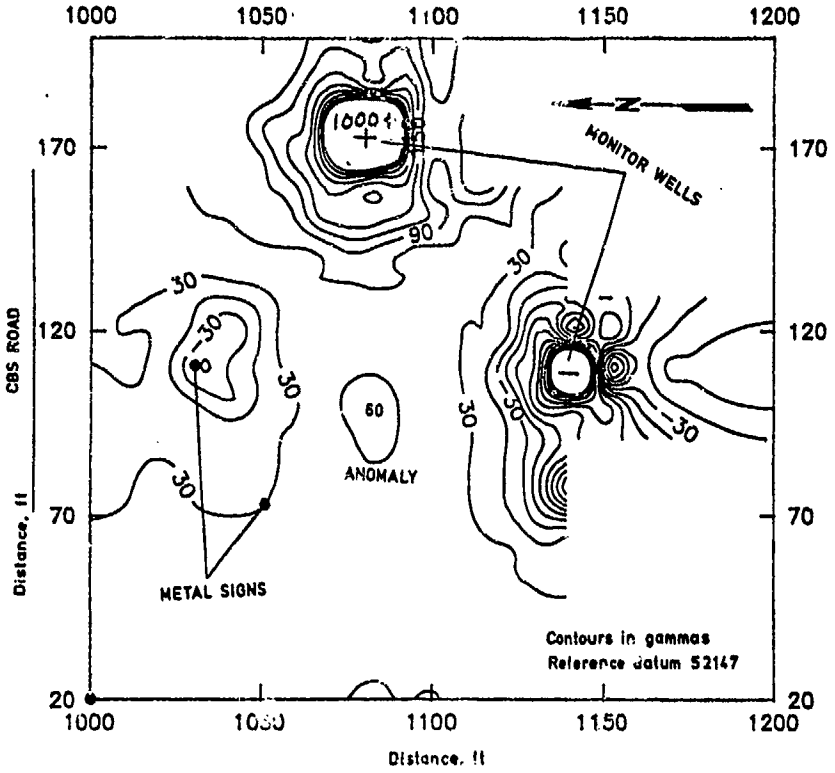


Figure 2. Magnetic intensity at CBS (contoured)

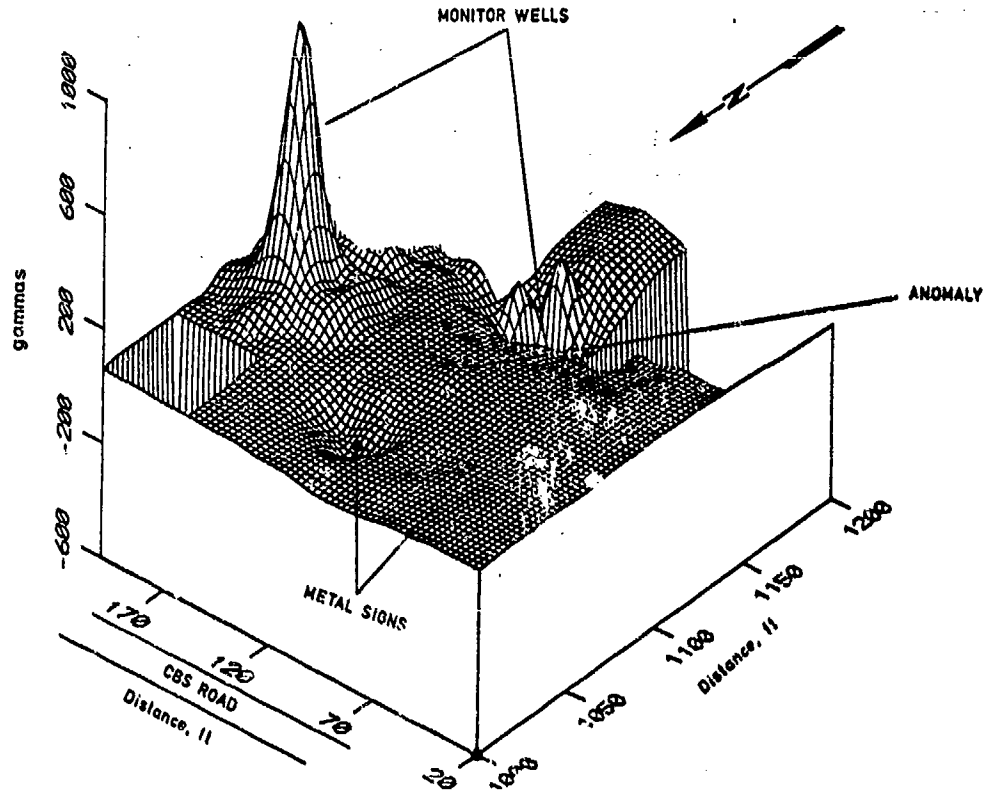


Figure 3. Magnetic intensity at CBS (block diagram)

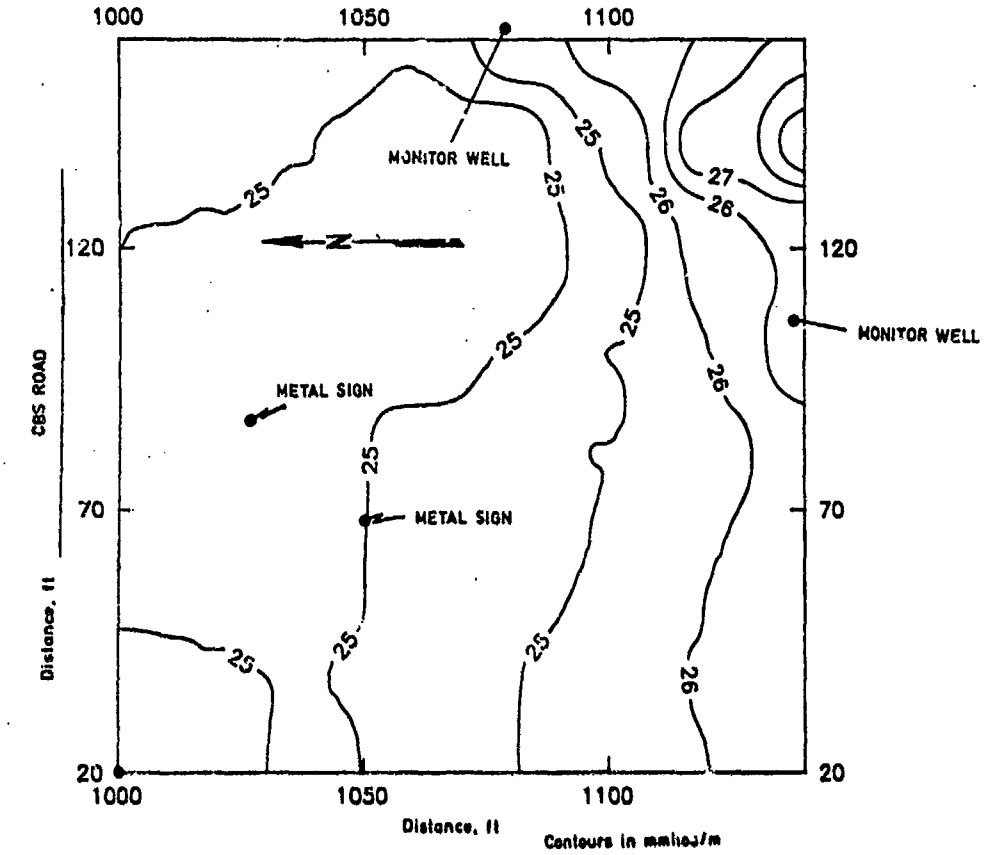


Figure 4. Conductivity at CBS (contoured)

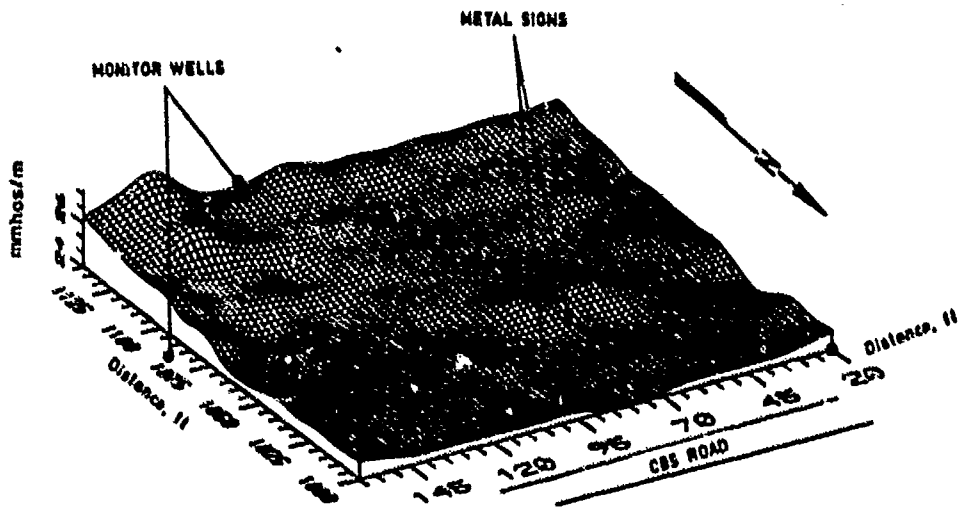


Figure 5. Conductivity at CBS (block diagram)

Hole No.

DRILLING LOG	DIVISION	INSTALLATION: LONE STAR AAP	SHEET 1 OF 1 SHEETS
1. PROJECT: CHEMICAL BURIAL SITE		10. SIZE AND TYPE OF BIT: 7¼" BOX AUGER	
2. LOCATION (Coordinates or Station): N 649, 4-16 E 2,993,555		11. DATUM FOR ELEVATION SHOWN (TBM or MSL): MSL	
3. DRILLING AGENCY: MEMPHIS DIST., CE		12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500	
4. HOLE NO. (As shown on drawing title and file number): CBS-1		13. TOTAL NO. OF SAMPLES TAKEN: DISTURBED 10 / UNDISTURBED 0	
5. NAME OF DRILLER: LOUIS DYCHE		14. TOTAL NUMBER CORE BOXES: 0	
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: 316.7' (2/6/88)	
7. THICKNESS OF OVERBURDEN: —		16. DATE HOLE: STARTED 2 JUNE 88 / COMPLETED 2 JUNE 88	
8. DEPTH DRILLED INTO ROCK: —		17. ELEVATION TOP OF HOLE: 332.1'	
9. TOTAL DEPTH OF HOLE: 32.5'		18. TOTAL CORE RECOVERY FOR BORING: — %	
		19. SIGNATURE OF INSPECTOR: R.J. LUTTON (CEWESGR)	

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
332.1	0		SAND, gravelly, 10 YR 4/6			
	2		5 pb / 80 sa / 15 si	1		
			CLAY, stiff, 5 Y 6/1			
	4					
				2		
	6		SAND, silty	3		
			50 sa / 50 si			
	8		clean sand 7-8'			
	10			4		
	12		SILT, sandy, clayey			
			30 sa / 50 si / 20 cl, 5YR 5/6			
W.T ▽ 317.6 (3/6/88)	14		CLAY, hard, 5 Y 6/1	5		
	16		SAND, silty, clayey			
			50 sa / 50 si, 10 YR 5/4	6		
	18					
	20					
			pcb (1) at 21.2'	7		SILTY SAND (SM) *
	22		charcoal specks 20-22'			
	24		SILT, sandy, clayey,	8		
			35 sa / 55 si / 10 cl			
	26		mostly sand 25-26'			
			SAND, silty, 5Y 6/1			
	28		50 sa / 40 si / 10 cl			
			Red, cemented 29.6'	9		
	30		clayey 10YR 6/2	10		CLAYEY SAND (SC) *
299.6	32		Bottom of hole 32.5'			
						* Grain gradation in Appendix B

Figure 6. Geological log of CBS-1

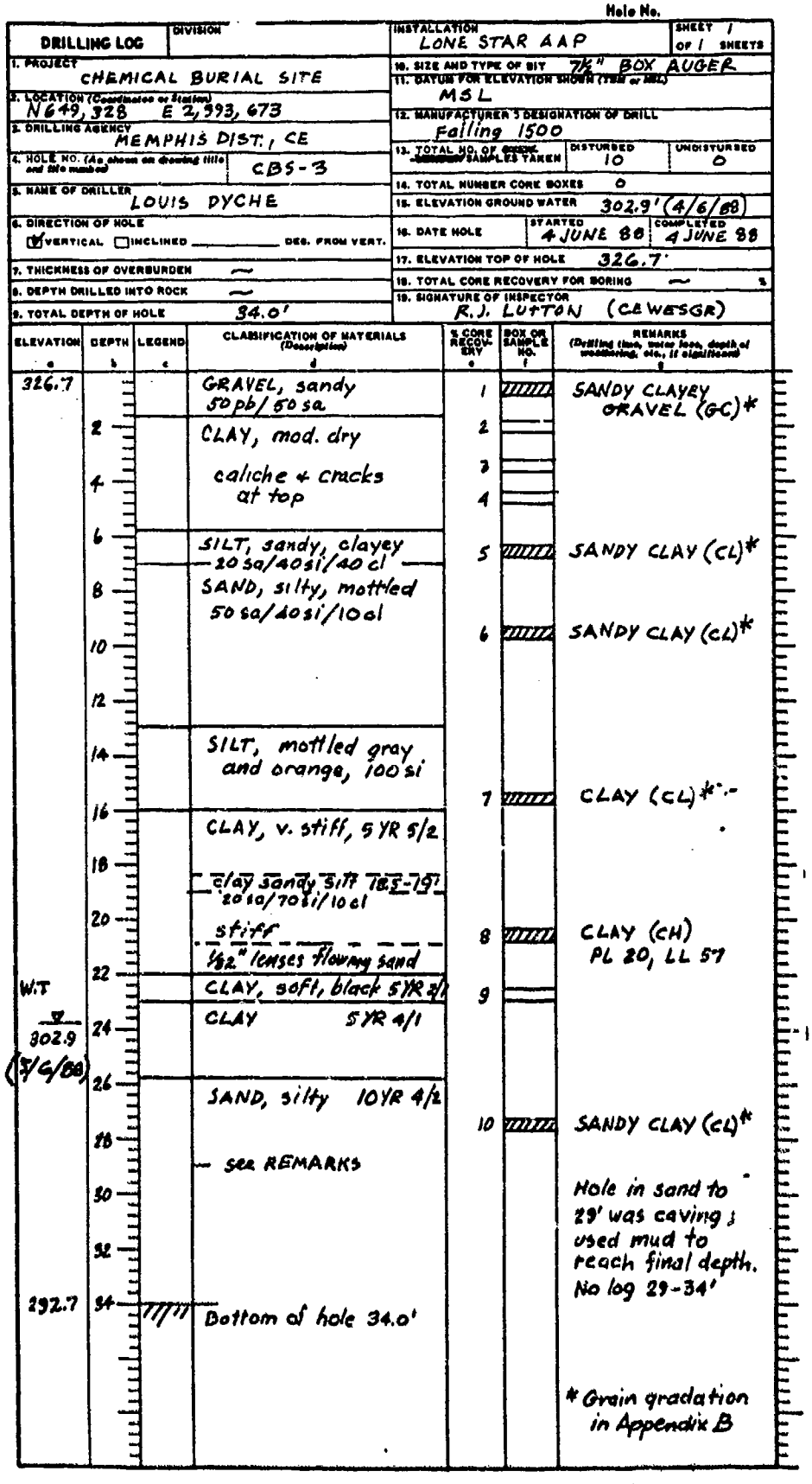
Hole No.

DRILLING LOG	DIVISION	INSTALLATION: LONE STAR AAP	SHEET 1 OF 1 SHEETS
1. PROJECT: CHEMICAL BURIAL SITE		10. SIZE AND TYPE OF BIT: 7¼" BOX AUGER	
2. LOCATION (Coordinates or Station): N649,325 E 2,993,567		11. DATUM FOR ELEVATION SHOWN (MSL or MSL): MSL	
3. DRILLING AGENCY: MEMPHIS DIST. CE		12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500	
4. HOLE NO. (As shown on drawing title and file number): CBS-2		13. TOTAL NO. OF CORE AND DISTURBED SAMPLES TAKEN: DISTURBED 10 / UNDISTURBED 0	
5. NAME OF DRILLER: LOUIS DYCHE		14. TOTAL NUMBER CORE BOXES: 0	
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED _____ DEG. FROM VERT.		15. ELEVATION GROUND WATER: 317.6' (3/6/88)	
7. THICKNESS OF OVERBURDEN: ~		16. DATE HOLE: STARTED 3 JUNE 88 / COMPLETED 3 JUNE 88	
8. DEPTH DRILLED INTO ROCK: ~		17. ELEVATION TOP OF HOLE: 329.2'	
9. TOTAL DEPTH OF HOLE: 24.0'		18. TOTAL CORE RECOVERY FOR BORING: ~ %	
		19. SIGNATURE OF INSPECTOR: R. J. LUTTON (CEWESGR)	

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
329.2	2		SAND, gravelly, 5YR 5/6 35 pb/55 sa/10 si	1		
	4		CLAY, stiff, 5Y 6/1 caliche vein 3-4'	2 3 4		CLAY (CH) PL 28, LL 99
	6		SAND, silty 60 sa/40 si'	5		SILTY SAND (SM)*
	8		More clay 9-10'	6		CLAYEY SAND (SC)*
	10		50 sa/50 si'			
W.T. ▽ 316.7 (5/6/88)	12					
	14		more clay 13-15' 5GY 6/1	7		CLAY (CH) w. SAND*
	16		CLAY, heavy ¼" lenses flowing sand	8		CLAY (CH) PL 27, LL 101
	18		SAND, silty, 5Y 6/1 50 sa/50 si'	9		CLAYEY SAND (SC)*
	20					
	22			10		SANDY CLAY (CL)*
305.2	24		SILT, sandy, clayey lenses flowing sand 23-24' Bottom of hole 24.0'			
	26					

*Grain gradation in Appendix B

Figure 7. Geological log of CBS-2



Hole No.

DRILLING LOG | DIVISION | INSTALLATION: LONE STAR AAP | SHEET 1 OF 1 SHEETS

1. PROJECT: CHEMICAL BURIAL SITE
2. LOCATION (Coordinates or Station): N649,328 E 2,393,673
3. DRILLING AGENCY: MEMPHIS DIST.; CE
4. HOLE NO. (As shown on drawing title and site number): CBS-3
5. NAME OF DRILLER: LOUIS DYCHE
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN: ~
8. DEPTH DRILLED INTO ROCK: ~
9. TOTAL DEPTH OF HOLE: 34.0'
10. SIZE AND TYPE OF BIT: 7¼" BOX AUGER
11. DATUM FOR ELEVATION SHOWN (MSL or MLL): MSL
12. MANUFACTURER'S DESIGNATION OF DRILL: Failing 1500
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED 10; UNDISTURBED 0
14. TOTAL NUMBER CORE BOXES: 0
15. ELEVATION GROUND WATER: 302.9' (4/6/88)
16. DATE HOLE: STARTED 4 JUNE 88; COMPLETED 4 JUNE 88
17. ELEVATION TOP OF HOLE: 326.7'
18. TOTAL CORE RECOVERY FOR BORING: ~ %
19. SIGNATURE OF INSPECTOR: R.J. LUTTON (CEWESGR)

ELEVATION (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
326.7			GRAVEL, sandy 50 pb/ 50 sa	1		SANDY CLAYEY GRAVEL (GC)*
	2		CLAY, mod. dry	2		
	4		caliche & cracks at top	3		
				4		
	6		SILT, sandy, clayey 20 sa/40 si/40 cl	5		SANDY CLAY (CL)*
	8		SAND, silty, mottled 50 sa/40 si/10 cl			
	10			6		SANDY CLAY (CL)*
	12					
	14		SILT, mottled gray and orange, 100 si			
	16		CLAY, v. stiff, 5 YR 5/2	7		CLAY (CL)*
	18		clay sandy silt 18.5-19' 20 sa/70 si/10 cl			
	20		stiff	8		CLAY (CH) PL 20, LL 57
			1/32" lenses flowing sand			
	22		CLAY, soft, black 5YR 2/1	9		
W.T. ▽ 302.9 (4/6/88)	24		CLAY 5YR 4/1			
	26		SAND, silty 10YR 4/2			
	28		— see REMARKS	10		SANDY CLAY (CL)*
	30					Hole in sand to 29' was caving; used mud to reach final depth. No log 29-34'
	32					
292.7	34		Bottom of hole 34.0'			* Grain gradation in Appendix B

Figure 8. Geological log of CBS-3

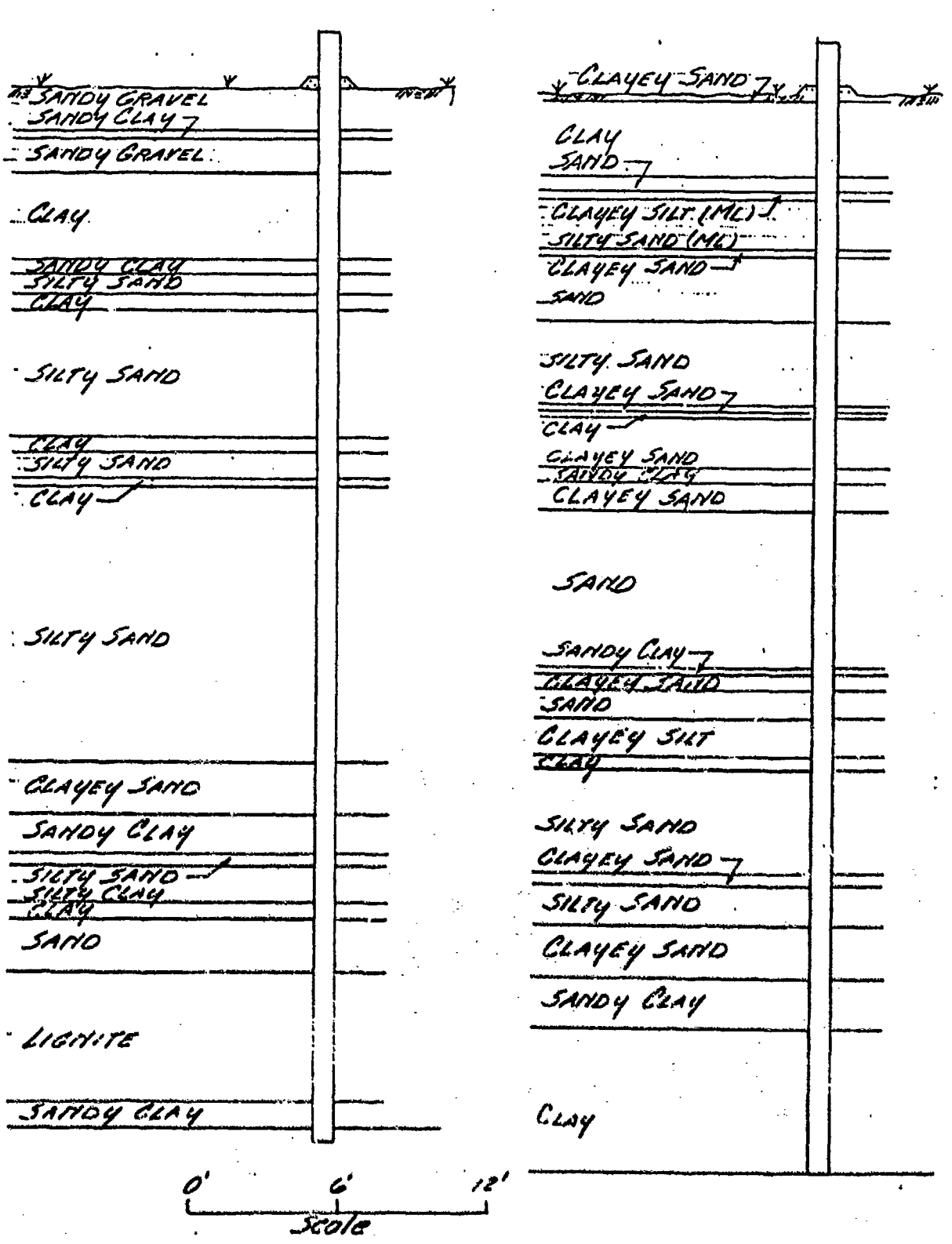


Figure 9. Summary logs of 24 and 25

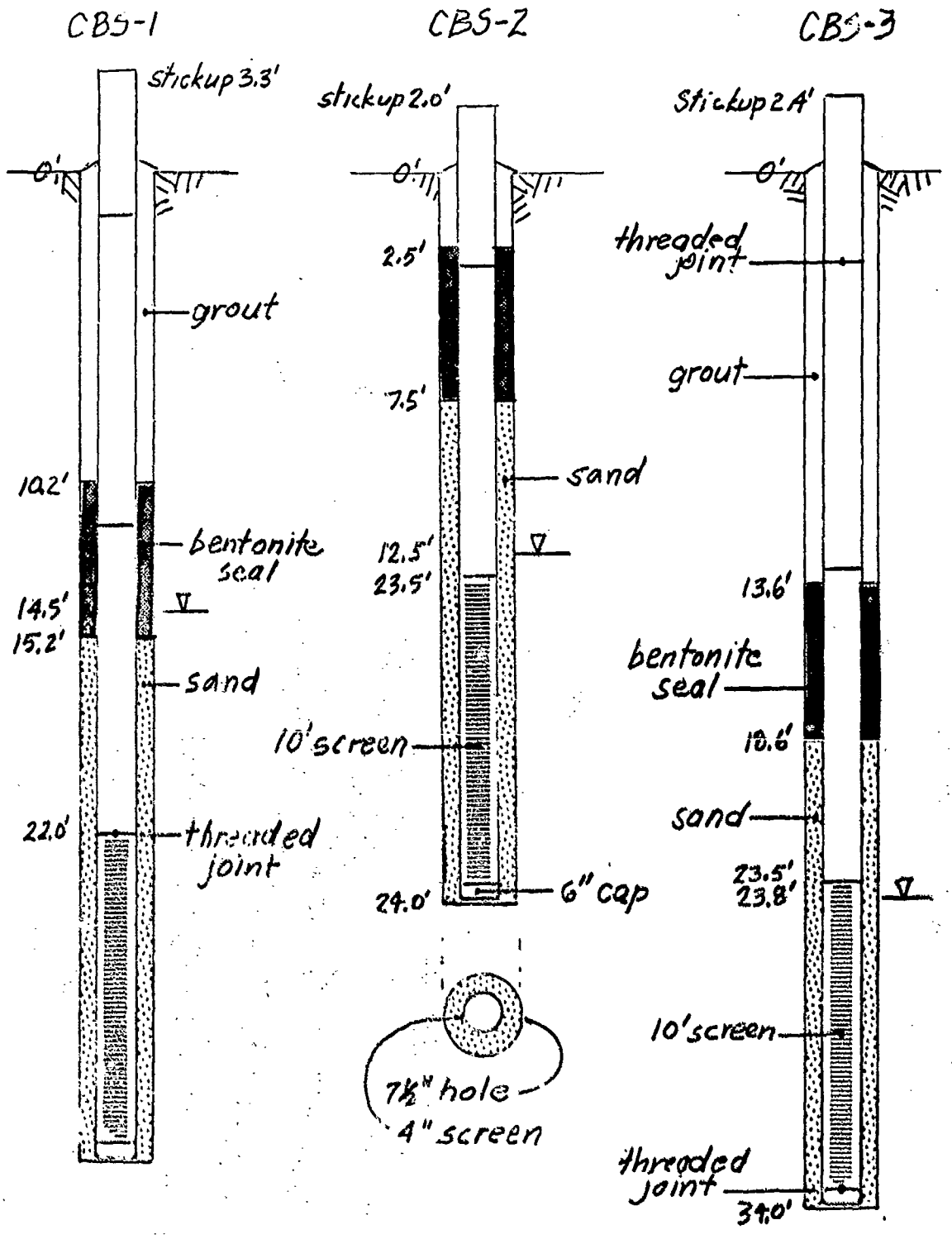
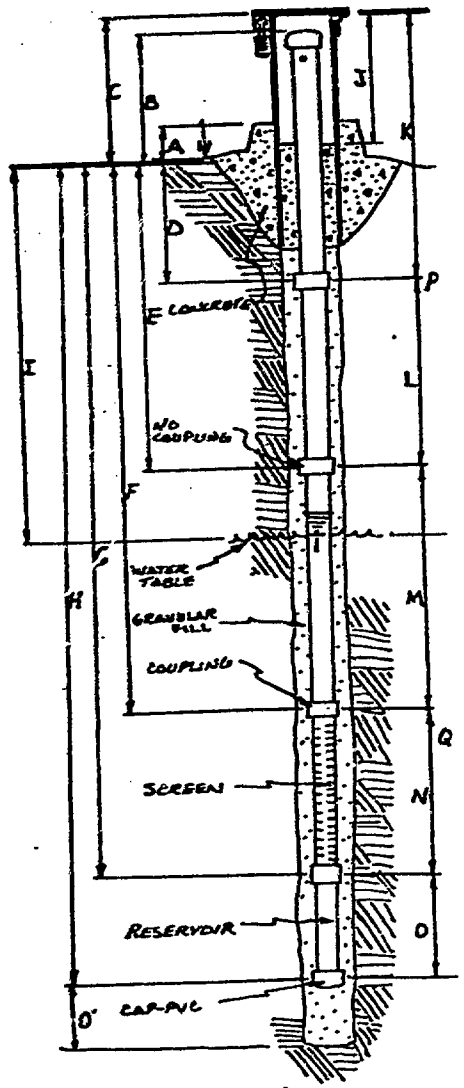


Figure 10. Well construction details of CBS-1, -2, and -3

	WELL 24	WELL 25
A	0'-3"	0'-3"
B	1'-5"	1'-11"
C	2'-1"	2'-1"
D	10'-8"	11'-6"
E	10'-8"	11'-6"
F	30'-8"	31'-6"
G	40'-8"	41'-6"
H	40'-8"	41'-6"
I	34'-1"	18'-8"
J	2'-7"	2'-2"
K	12'-1"	11'-7"
L	0'-0"	11'-7"
M	20'-0"	20'-0"
N	10'-0"	10'-0"
O	0'-0"	0'-0"
P	36'-2"	14'-9"
Q	6'-7"	28'-10"



Notes:

(1) Protective casing includes lockable flat square hinged top w/lock.

(2) Concrete seal includes a 6" dry sacrete plug resting against granular fill material.

(3) All well pipe and screen consists of Schedule 40 PVC.

(4) Formation sampling depth 40.0'.

(5) Bored depth prior to well installation 40.0'.

(6) Water level on 10-28-81

(7) Well pipe and screen installed through hollow auger, then auger removed.

(8) Granular Fill-Clean Coarse Sand between sieve openings 3.36 mm and 1.41 mm.

(9) Guard posts to be installed at a later date.

(10) Commercially slotted screen has approx 29 in^2 per 10-ft section, slot size 0.010 in.

Figure 11. Well construction details of 24 and 25

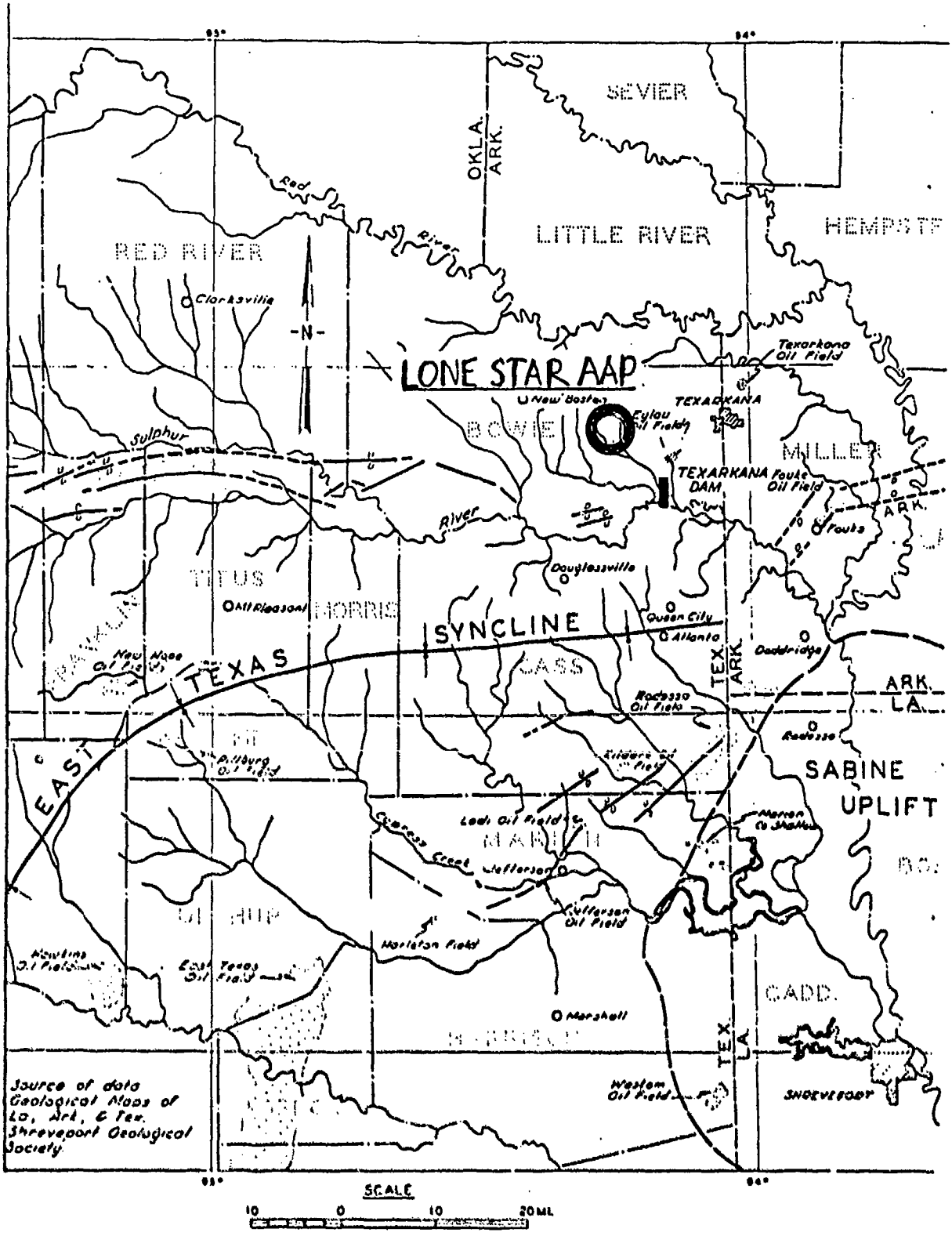


Figure 12. Geological structure in region

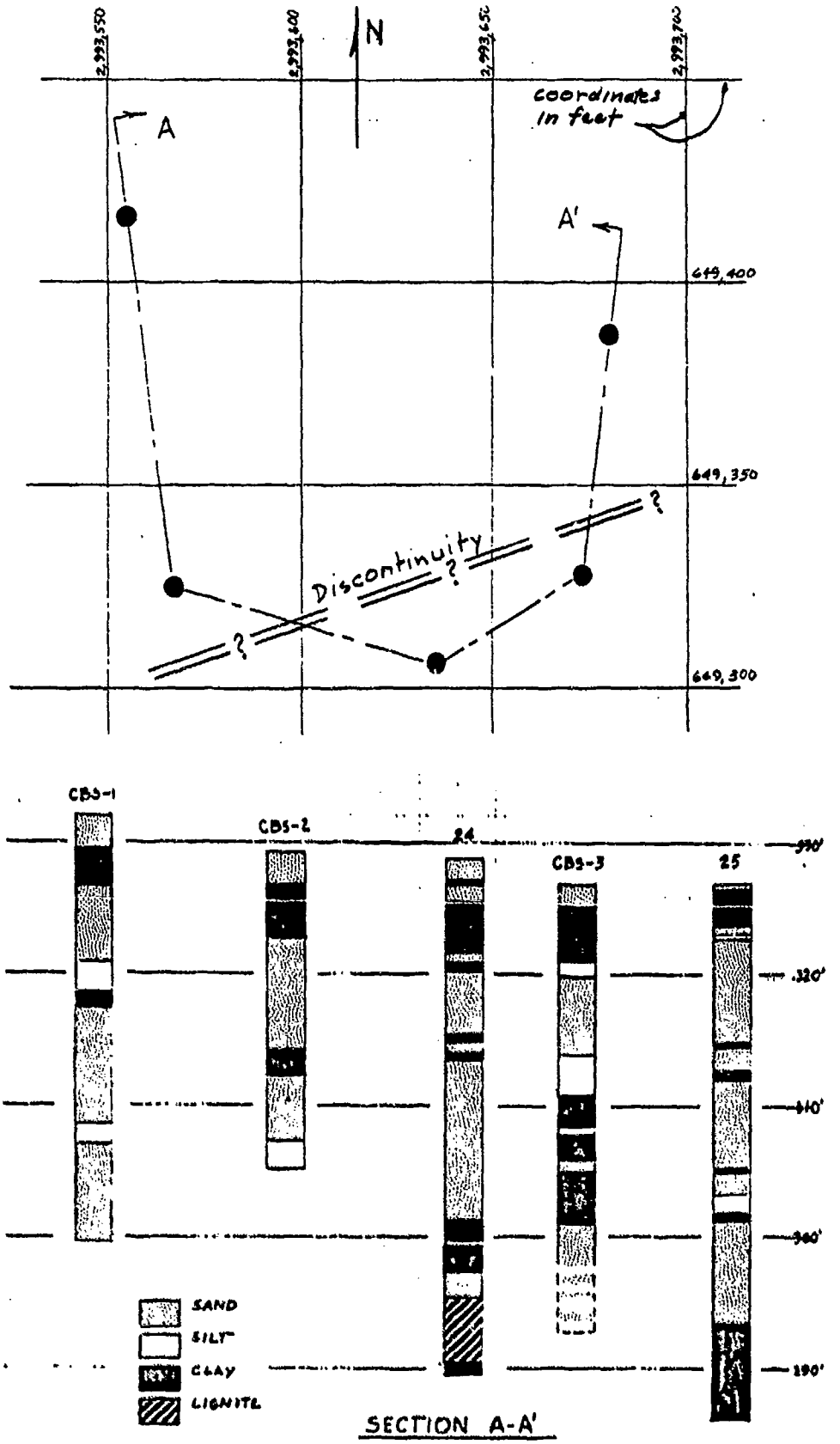


Figure 13. Geology at CBS

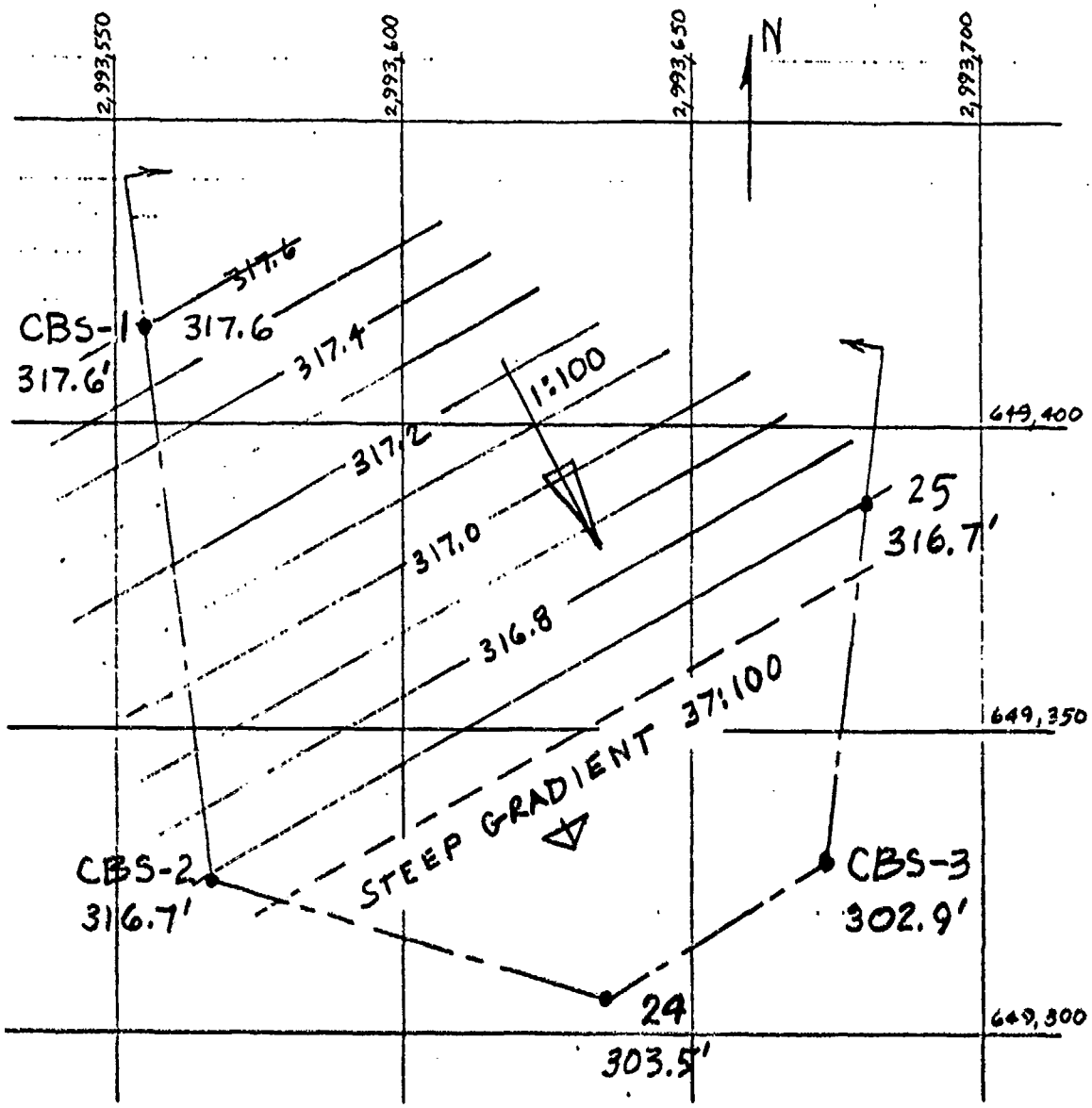


Figure 14. Water table at CBS

APPENDIX A: GEOPHYSICAL SUPVEYS AT LSAAP

Introduction

1. The purpose of these geophysical investigations was to locate anomalous areas which might be indicative of buried hazardous waste. Three locations were surveyed and results are presented herein. Location 2 is equivalent to Site 16, the Chemical Burial Site. Locations 1 and 3 are included only to preserve the continuity of the original survey assignment.

Survey Methods

2. A 20 × 20-ft grid was established for surveying all three locations. Additional measurements were made on a 10 × 10-ft grid pattern around anomalous regions. Measurements were also taken in the perimeter areas so that a regional field could be established to compare with the local measurements. The two geophysical methods employed were magnetic and conductivity surveys.

3. The magnetic survey was conducted by measuring total magnetic field strength using a proton precession magnetometer which had a measurement accuracy of 1 gamma. For reference, the average magnetic field strength of the earth is 50,000 gammas. A base station was established for each site and was reoccupied after every profile line. In this manner, the data could be drift corrected and any disruptive fluctuations in the magnetic field detected. The readings were stored in instrument memory, automatically drift corrected, and downloaded into a microcomputer at the end of the day for data analysis and display of results.

4. The conductivity survey was performed using an electromagnetic induction (EM) terrain conductivity system. This particular instrument has a receiver and transmitter located at opposite ends of a 4-m (13-ft) boom. The EM meter reading is a weighted average of the earth's conductivity as a function of depth. The weighting or sensitivity with depth is shown in Figure A1 for this particular instrument. Based on this sensitivity curve, which was obtained from the manufacturer's literature, the effective depth of investigation for this instrument is 6 m (19 ft). A thorough investigation to a depth of 13 ft is possible and below that the effect of conductive anomalies becomes more difficult to distinguish as their depth increases.

Data from EM surveys are obtained in units of mmho/m. Readings can be read to an accuracy of 0.5 mmho/m.

Data Presentation

5. Data collected during this study are presented in two formats. Each set of data is presented as a map of contours of the measured values and then a three dimensional view of the surface generated from these contours. Because the view of a 3-D surface will differ depending on the viewing orientation more than one view is sometimes necessary to show all the features of interest. A reference point is annotated on each plot in the set to enable easy comparison between them. Since the relative values, not the absolute values, of the measurements are of interest for this study, some adjustments were made to the data so that they would be easier to process and display. The magnetic data were adjusted by establishing a datum which represents a background or average reading for the location and subtracting this value from all readings from that location. This datum is shown on the contour maps. Because the conductivity measurements are expressed in a smaller numerical range and the data at each location showed little variation, it was not necessary for any adjustments to be made.

Anomaly Detection

6. Anomaly detection is limited by instrument accuracy and local "noise" or variation in the measurements caused by factors not associated with the anomalies of interest. For an anomaly to be significant, it must be two to three times greater than these factors. Also, since the anomaly amplitude is the key to detection, the size and depth of the feature causing the anomaly is also a very important factor in determining detectability and resolution. Lastly, the intensity of the anomaly is also a function of the degree of contrast in material properties between the anomaly and the surrounding material. For these surveys, the magnetic susceptibility and conductivity are the material properties being measured.

7. Based upon the methods employed, accuracy of the equipment, noise conditions at the locations, and the assumptions listed below, the probability of successful anomaly detection is high. The criteria for identifying and classifying anomalies is also presented.

Site Assumptions:

Depth of burial <15 ft

Estimated quantity - fifty 55-gal drums

Highly conductive containers and/or waste

Anomaly Detection Threshold:

Magnetic +/- 10 gammas

Conductivity +/- 10 mmho/m

Anomaly Ranking and Classification:

AAA - Magnetic High + Conductivity High

buried metallic objects, drums; conductive contaminant waste plume

AA - Magnetic Neutral + Conductivity High

Conductive contaminant waste plume

A - Magnetic High + Conductivity Neutral

Buried metallic objects, barrels; no contaminant waste plume

8. Anomaly depth determination requires that size, geometry, and material property contrast be known or assumed. These factors are related in that for a fixed anomaly amplitude and shape, there is no unique solution without fixing these parameters. For the purposes of this survey, a rule of thumb that the feature causing the anomaly will be at a depth no greater than the magnetic anomaly width should be adequate. A nomograph is shown in Figure A2 for estimating anomaly depth. For anomalies detected by the conductivity survey, depth determination is given in terms of limiting depth of investigation of the instrument.

Location 1 Results

9. Location 1 is situated about 700-ft due west of Site 16 as indicated in Figure A3. The magnetic survey showed very little variation as indicated by the 3-D projection of the magnetic data and the featureless contour plot, Figures A4 and A5, respectively. The conductivity survey results are shown in Figures A6 and A7. These plots again show a very smooth, clean appearance with no significant trends or anomalies. From these data, it can be concluded

no conductive or magnetic anomalies exist down to the depth of interest of 15 ft.

Location 2 (Site 16) Results

10. Site 16 is Location 2 investigated by geophysical surveys (Figure A3). The magnetic survey results are shown in Figures 2 and 3 as contour map and 3-D projection. This location was dominated by known anomalies consisting of the metallic warning signs and the two monitoring wells. There was an unexplained positive anomaly detected which corresponds to one that was found in a prior survey. This magnetic anomaly is annotated in the figures. Additional data was collected around the wells which accounts for the non-rectangular grid. The conductivity survey was not as affected by these features because of the orientation of the measurement field and the distance these features were from measurement points. The effect of thin vertical conductive features located on either side of the instrument will be small a few feet offset from it. The conductivity data show a very uniform non-anomalous site. These data are presented in Figures 4 and 5. The unexplained magnetic anomaly, rated "A" using the criteria in paragraph 7, has a magnitude of 60 gammas and a width of 20 ft, which could be interpreted as having a maximum depth of 20 ft. Magnetic anomalies often appear in matched positive and negative pairs representing dipoles like that of a bar magnet. However, if a very long magnet was vertically placed in the ground and surveyed, a monopole anomaly would be detected, which is the case with the monitoring wells.

Location 3 Results*

11. Location 3 is situated as shown in Figure A8 at a past home site, evidenced by a cistern and remnant foundation pier or chimney. The cistern was filled with metal refuse. To reduce "noise" at the location, surface metallic objects were removed before the survey was begun. Location 3 was dominated by the magnetic anomaly caused by the cistern. The magnetic survey

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* Location 3 is in a wooded area along an unnamed dirt road about 1,500 ft south of Old Boston Road and 2,500 ft west of the eastern boundary of LSAAP.

results are shown in Figures A9 through A11. Another anomaly is located to the southwest of the cistern. This anomaly has a width of 17 ft, a magnitude of 100 gammas, and shows the classic dipole nature. Also, there is another possible anomaly to the southeast of the cistern which is evidenced by the elongated contours around the cistern anomaly. The results from the conductivity survey are shown in Figures A12 and A13. The data show that conductivity increases in a southeast direction. Further readings outside the grid supported this general trend. Therefore, this increase is a broad area trend probably due to soil type change. The area around the cistern showed a flat, relatively low conductivity plateau. The anomalies at this location are ranked "A" (paragraph 7).

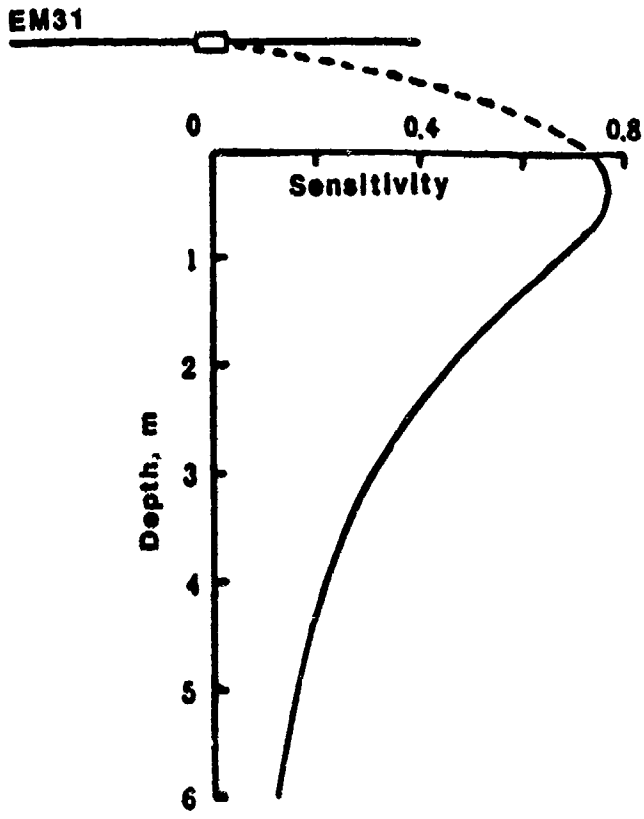


Figure A1. Sensitivity with depth of EM31 terrain conductivity meter.

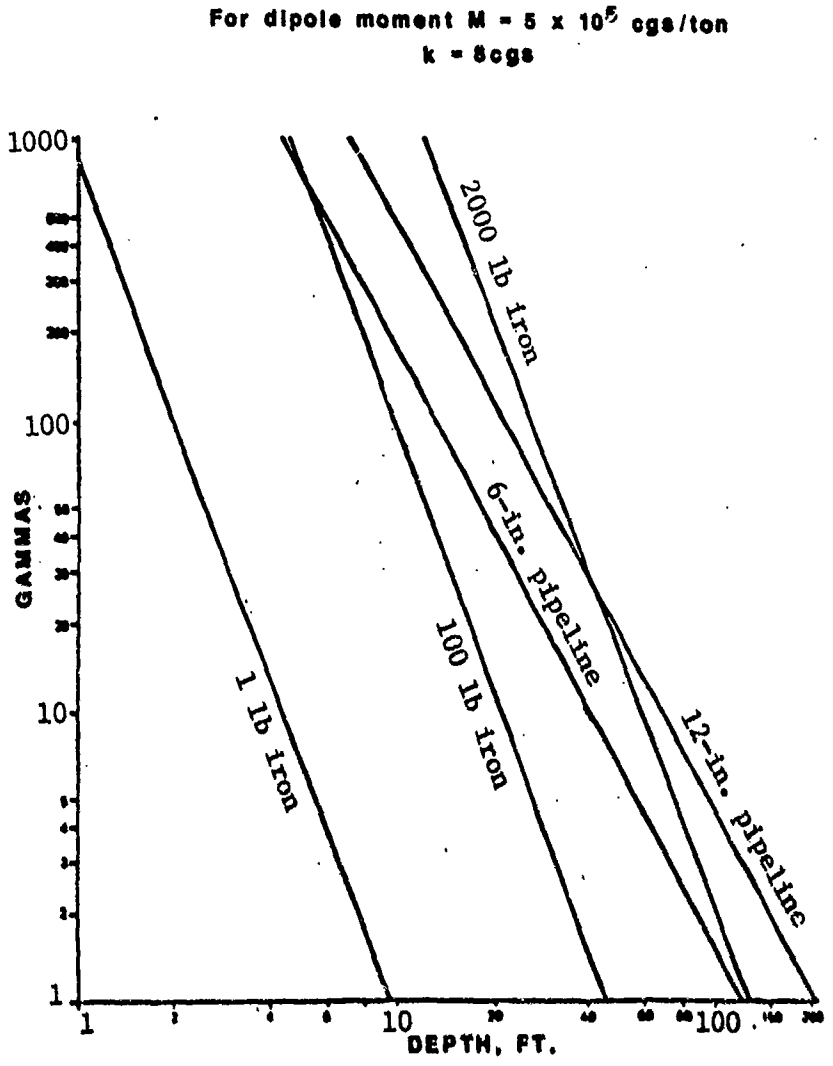


Figure A2. Nomograph for establishing magnetic anomaly depths.

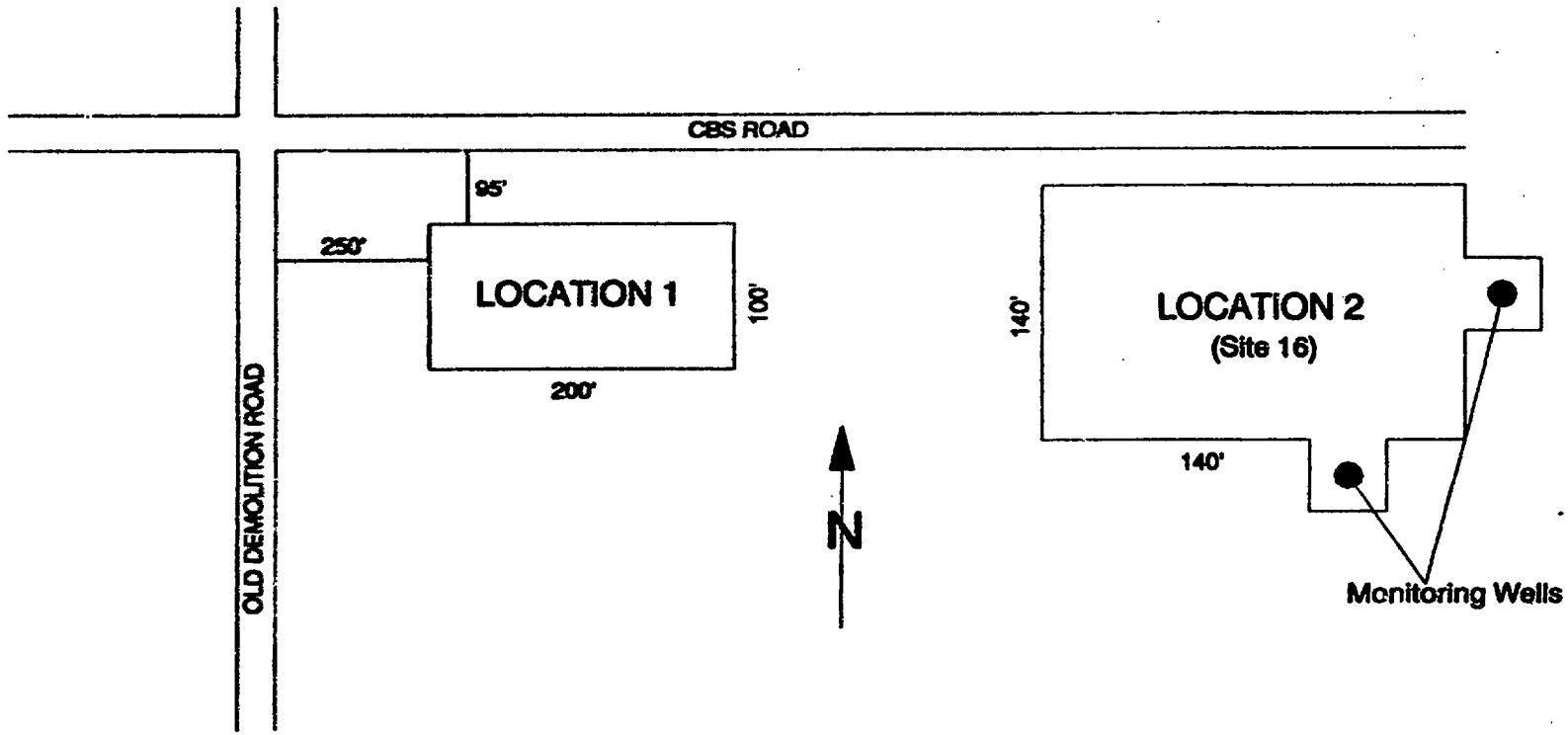


Figure A3. Survey limits for location 1 and 2 (site 16).

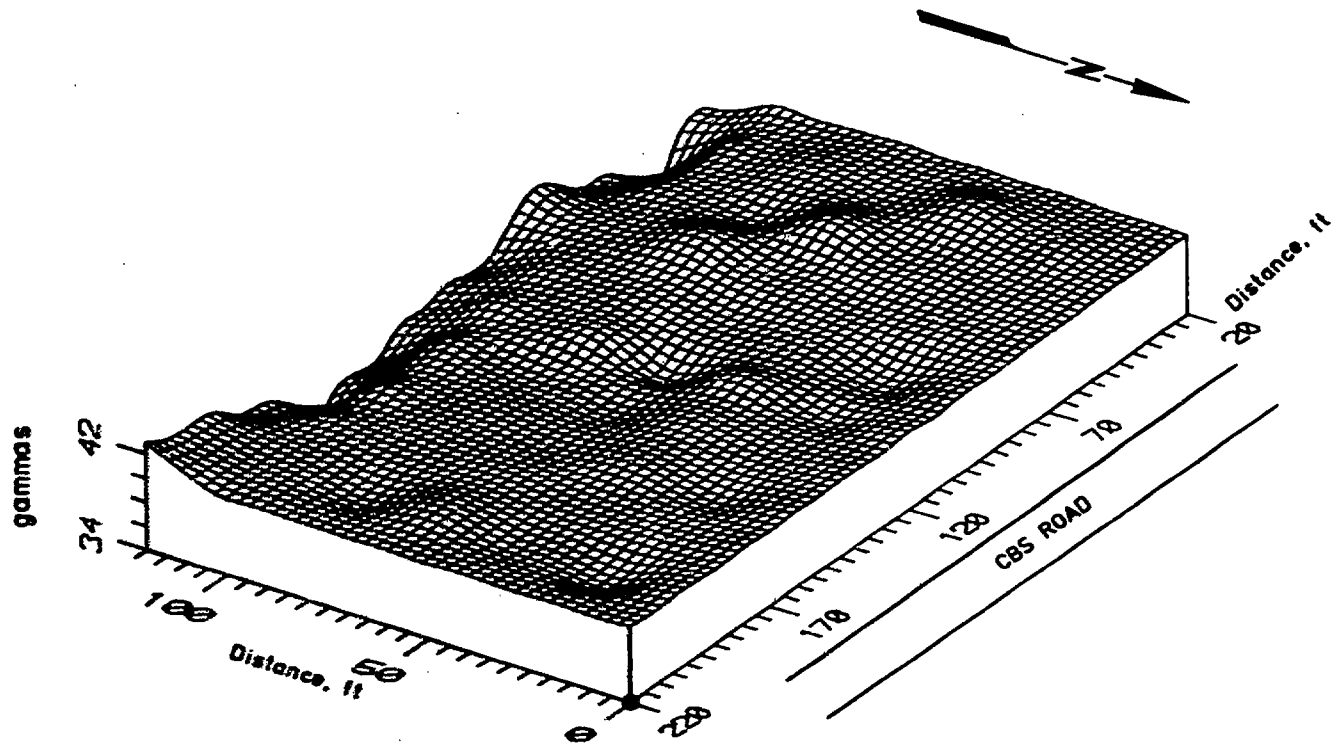


Figure A4. Location 1 magnetic survey 3—D projection of results.

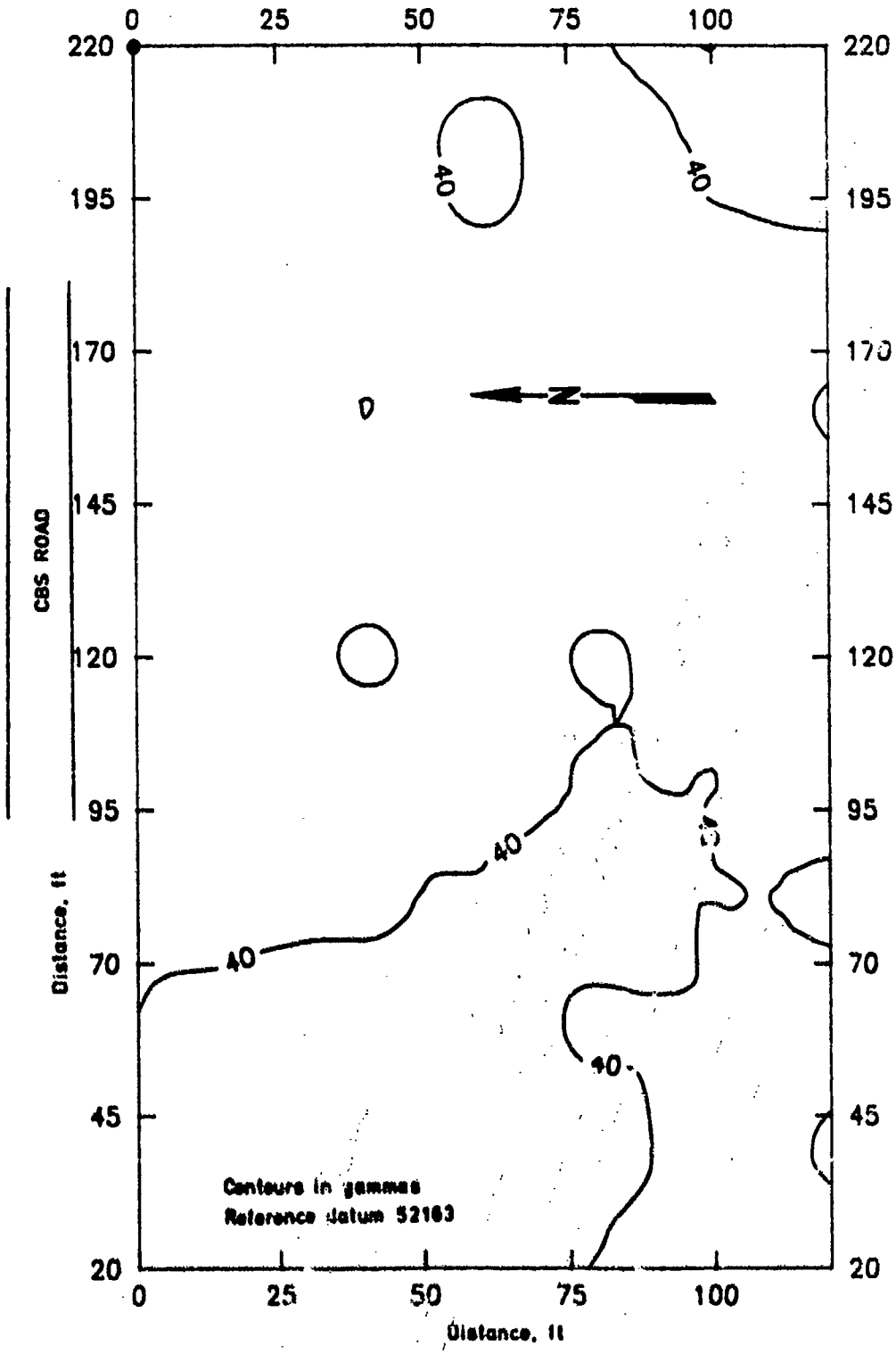


Figure A5. Location 1 magnetic survey contour oi results.

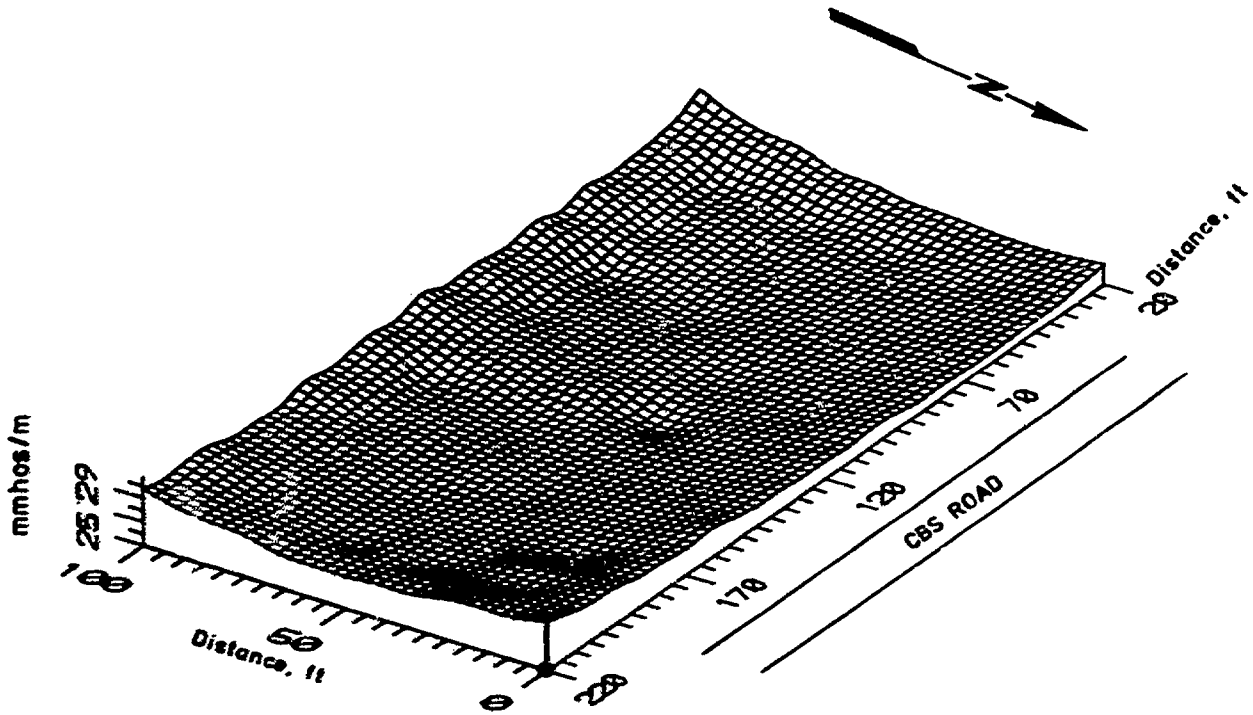


Figure A6. Location 1 conductivity survey 3—D projection of results.

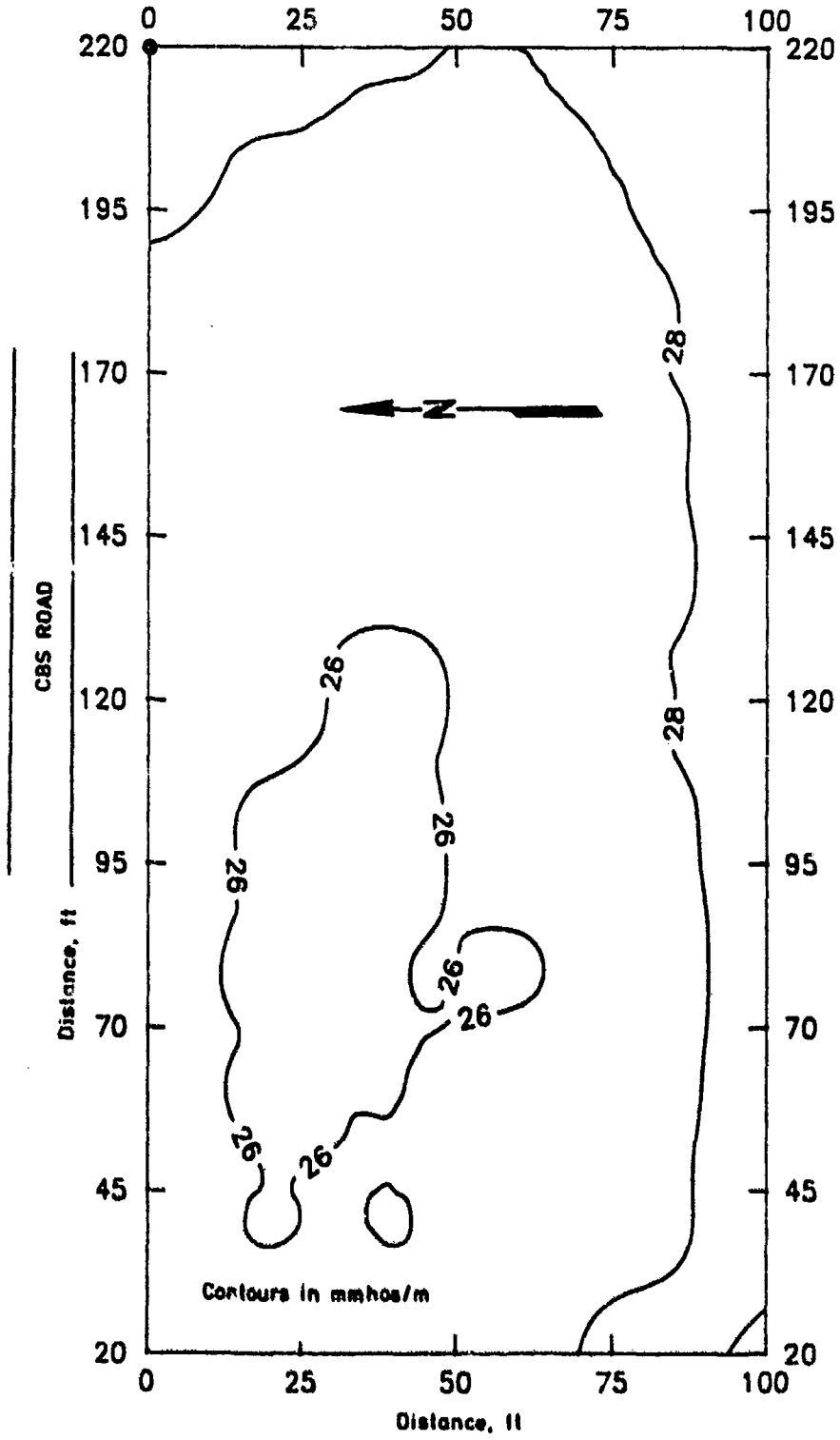


Figure A7. Location 1 conductivity survey contour of results.

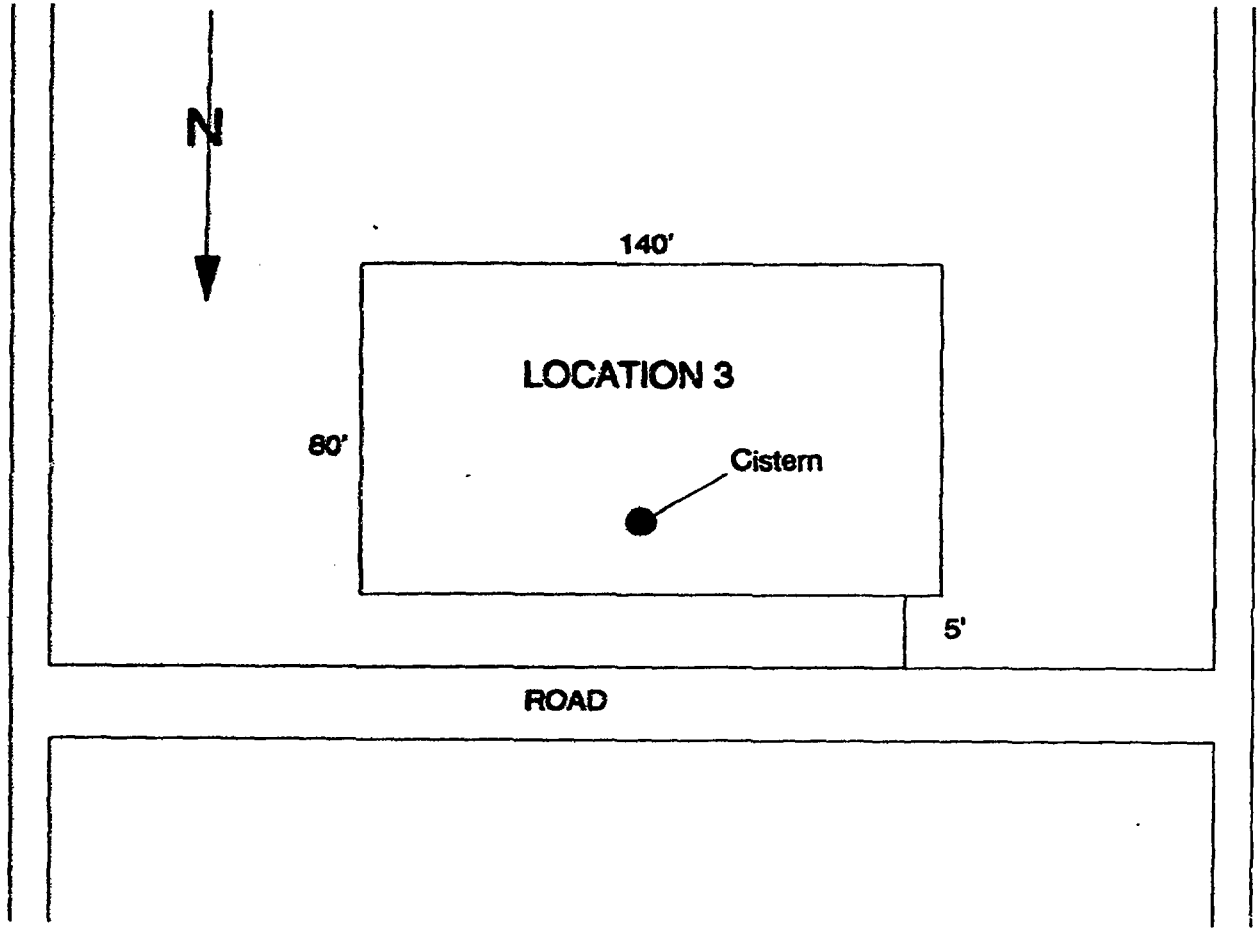


Figure A8. Location 3 survey limits

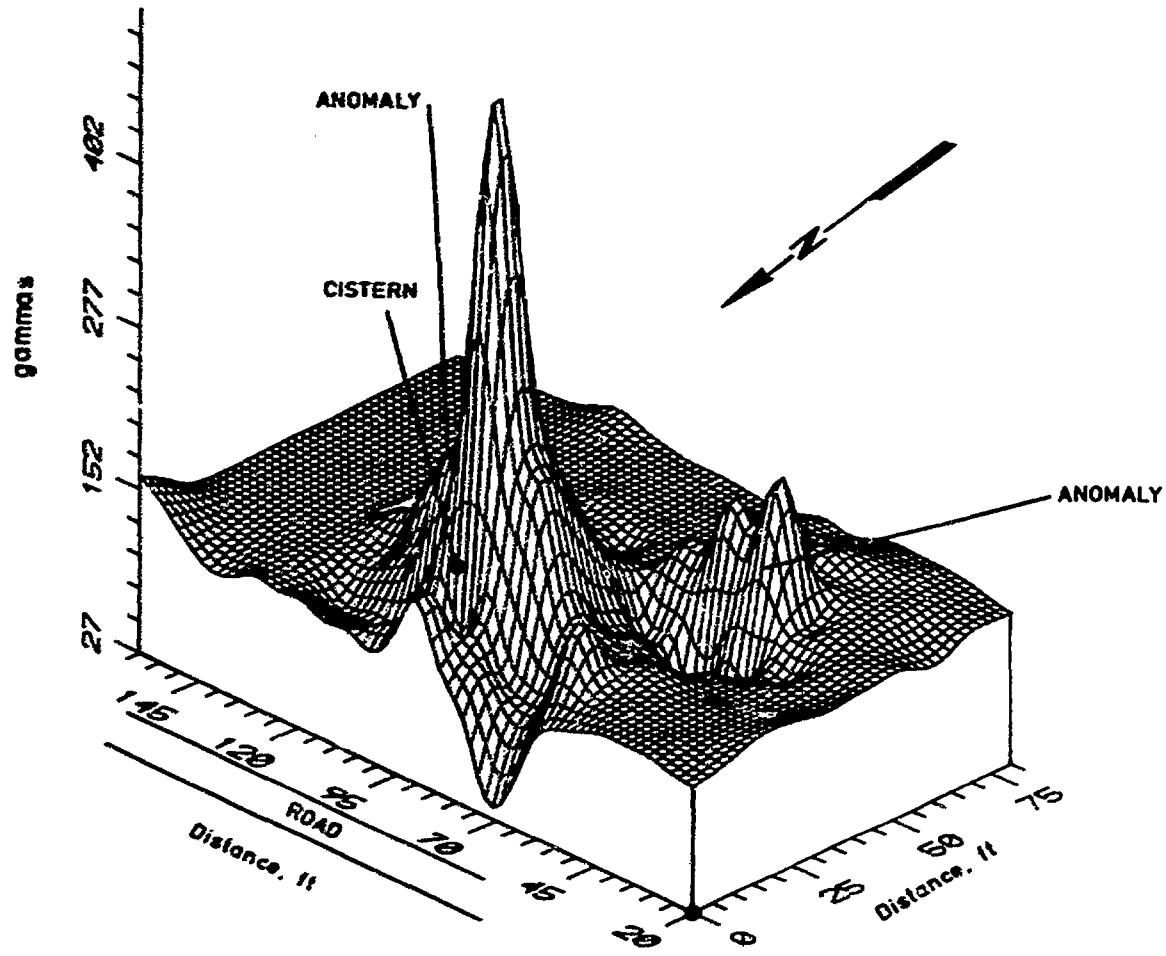


Figure A9.- Location 3 magnetic survey 3-D projection of results (view a).

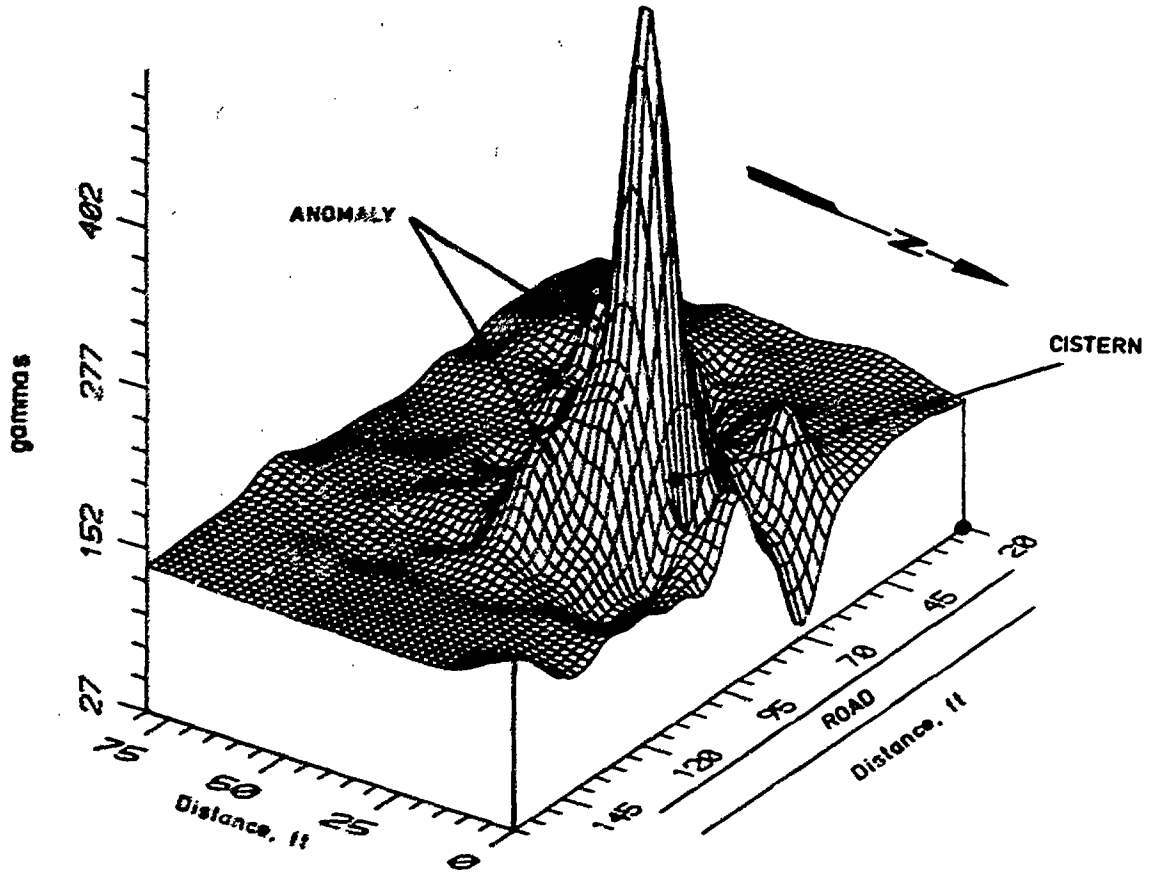


Figure A10. Location 3 magnetic survey 3-D projection of results (view b).

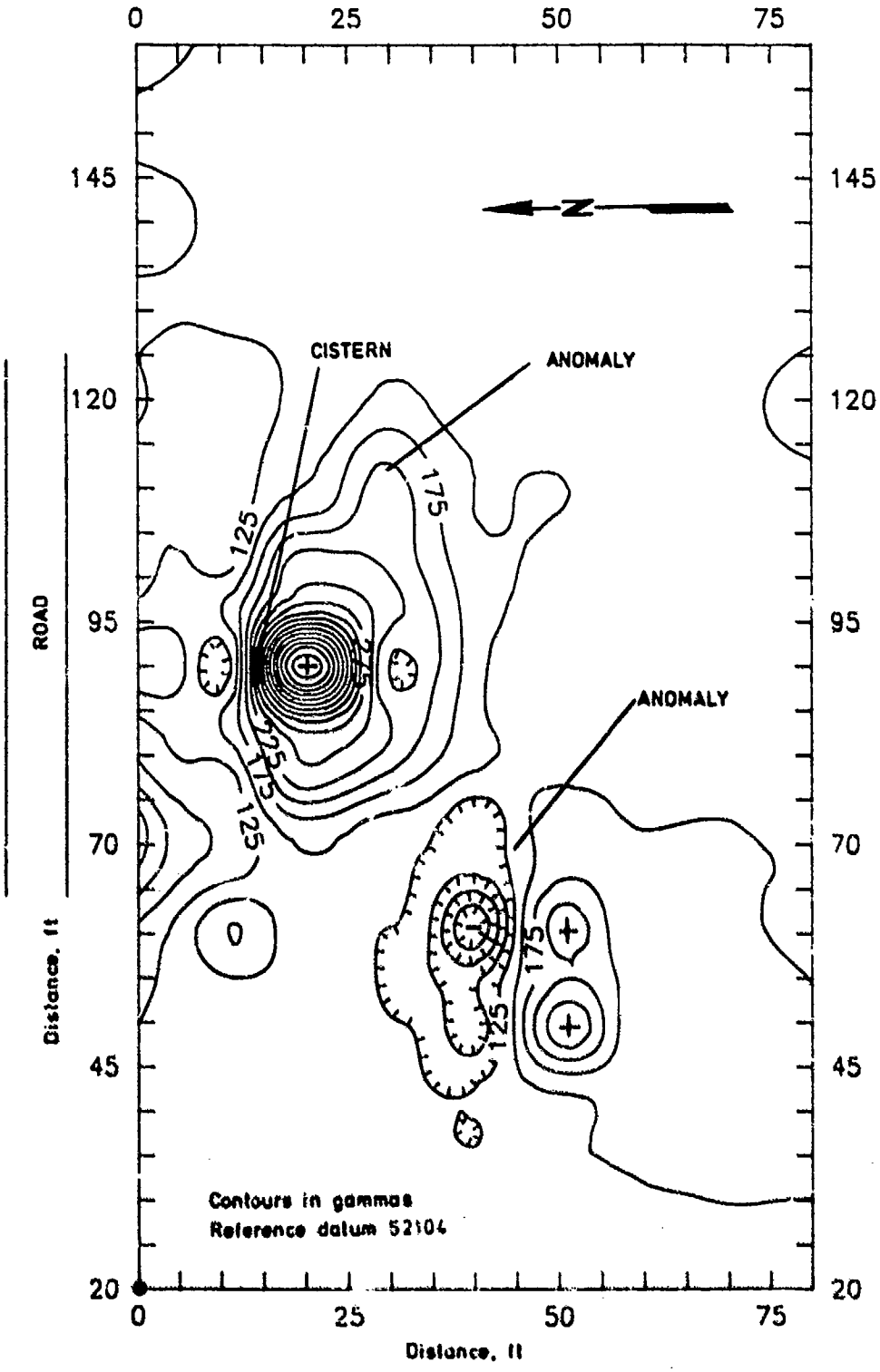


Figure A11 Location 3 magnetic survey contour of results

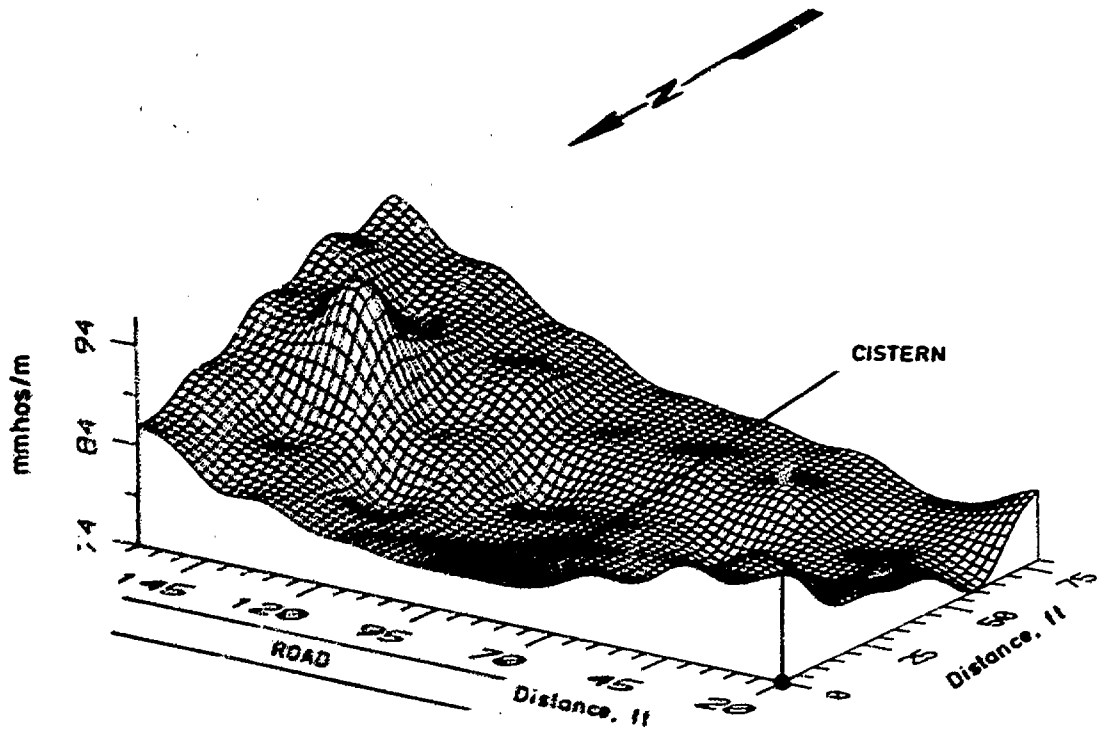


Figure A12. Location 3 conductivity survey 3-D projection of results.

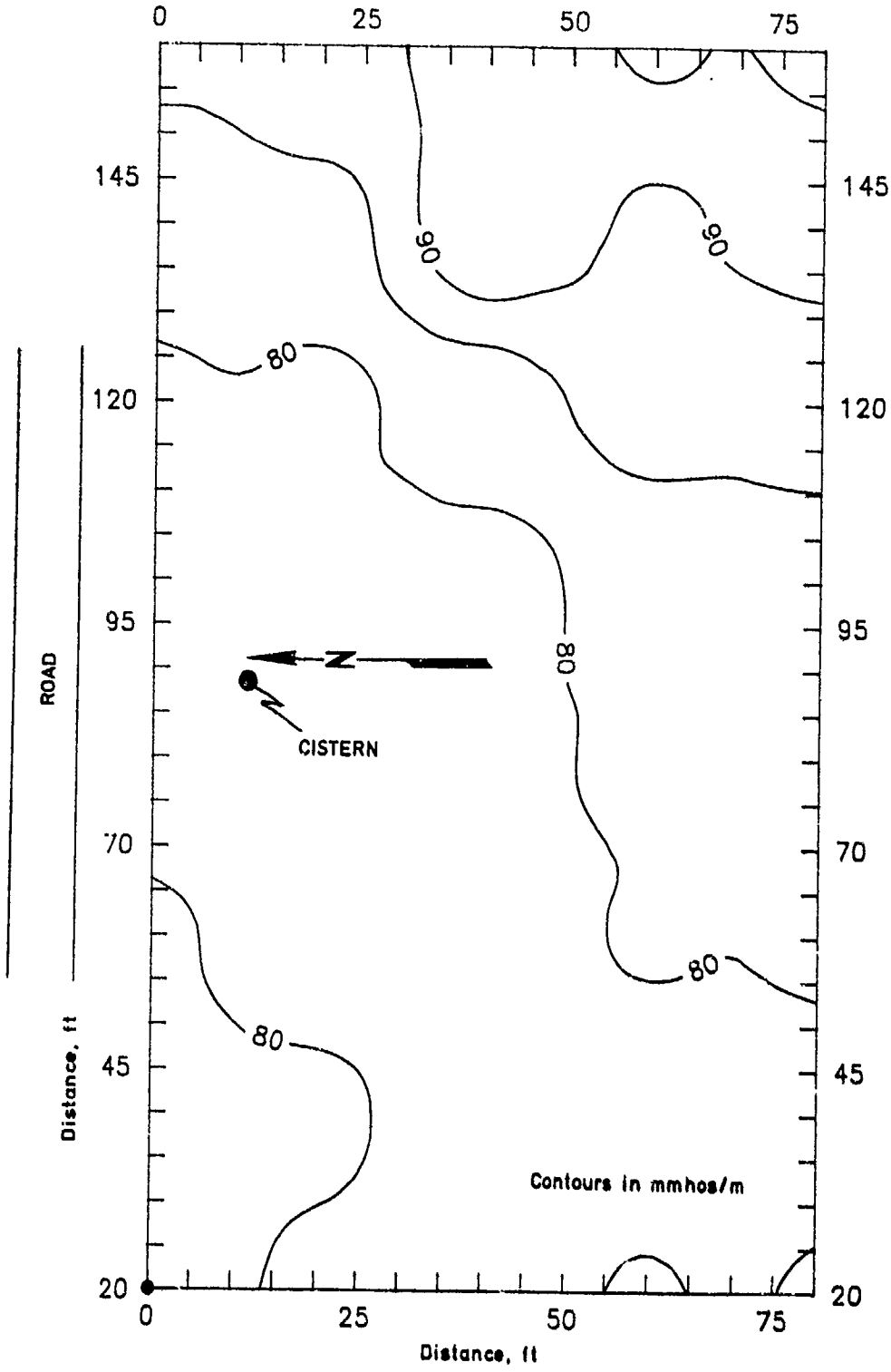


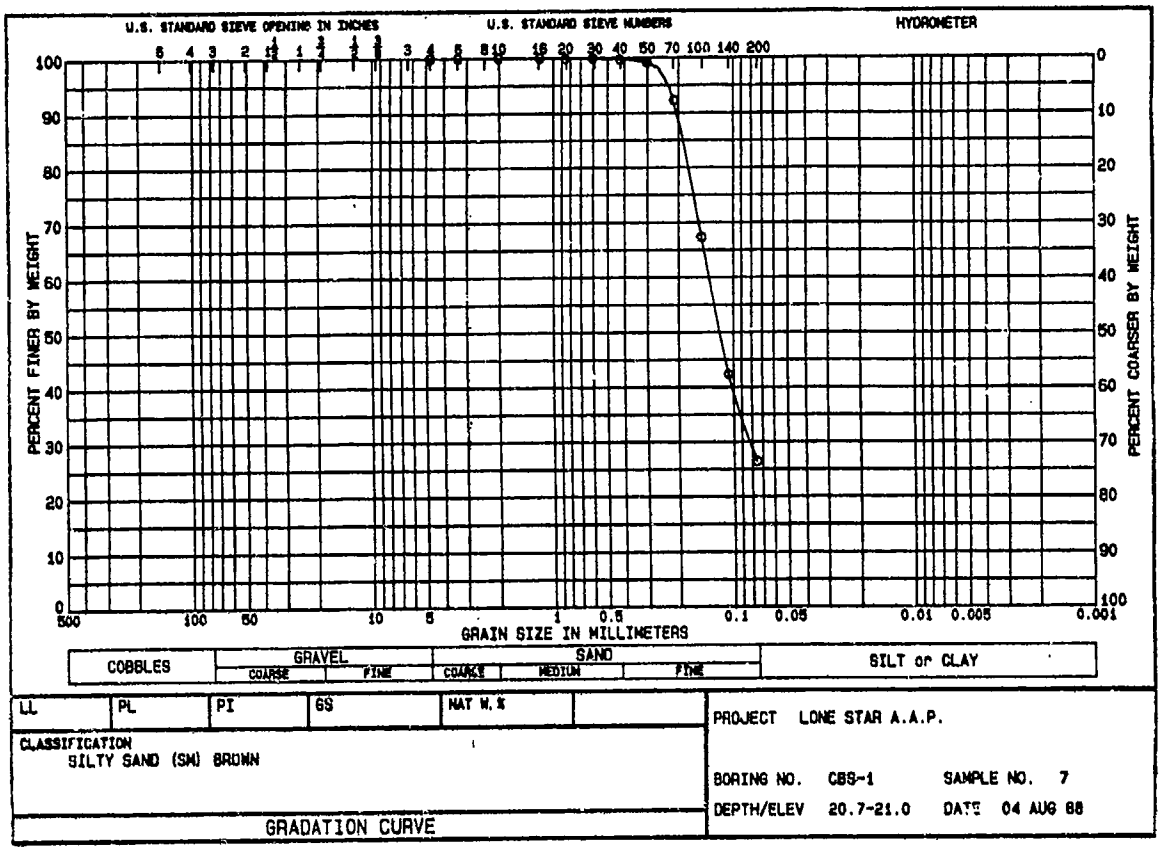
Figure A13. Location 3 conductivity survey contour of results.

APPENDIX B

SOIL TEST RESULTS

Soils Testing Facility

U.S. Army Engineer Waterways Experiment Station



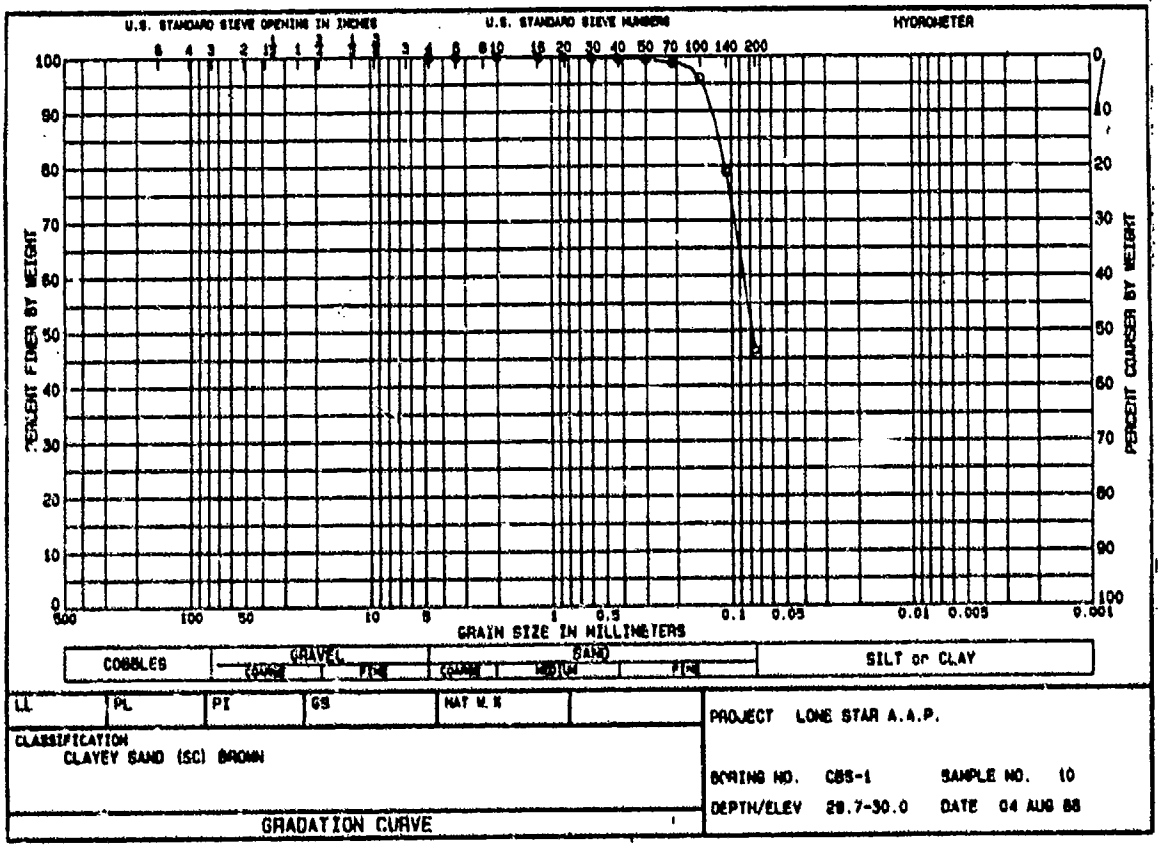
LL	PL	PI	GS	NAT W. %

CLASSIFICATION
SILTY SAND (SM) BROWN

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-1 SAMPLE NO. 7
DEPTH/ELEV 20.7-21.0 DATE 04 AUG 88



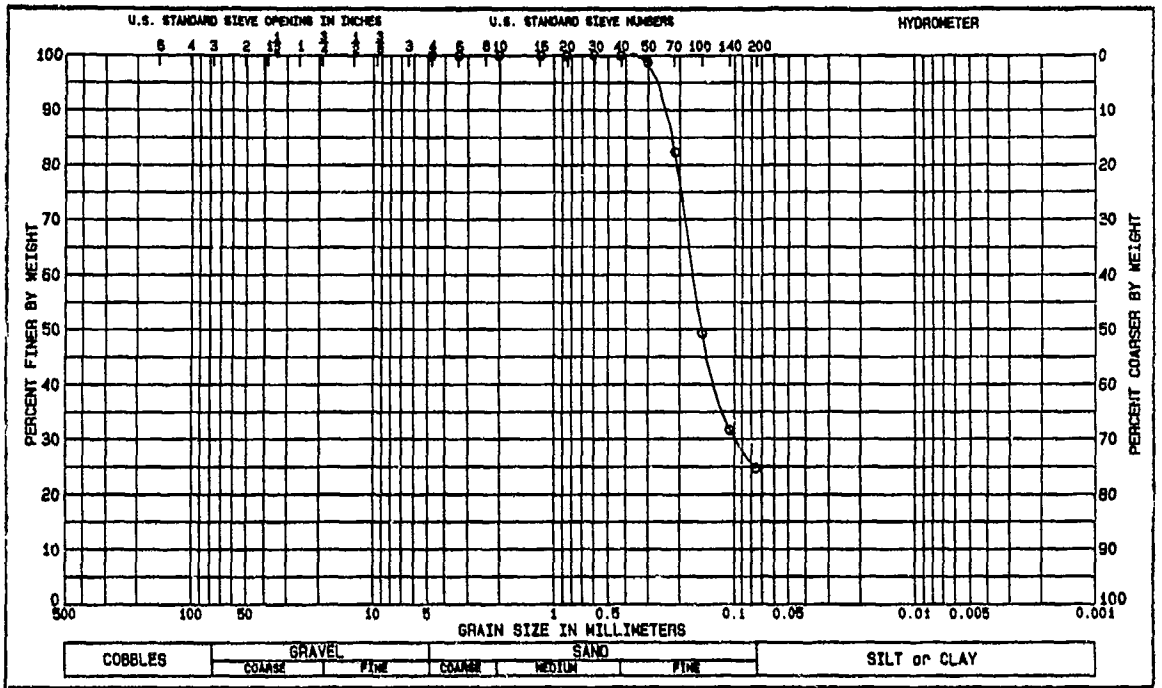
LL	PL	PI	GS	NAT W. %

CLASSIFICATION
CLAYEY SAND (SC) BROWN

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-1 SAMPLE NO. 10
DEPTH/ELEV 28.7-30.0 DATE 04 AUG 88



LL	PL	PI	GS	NAT M, %	

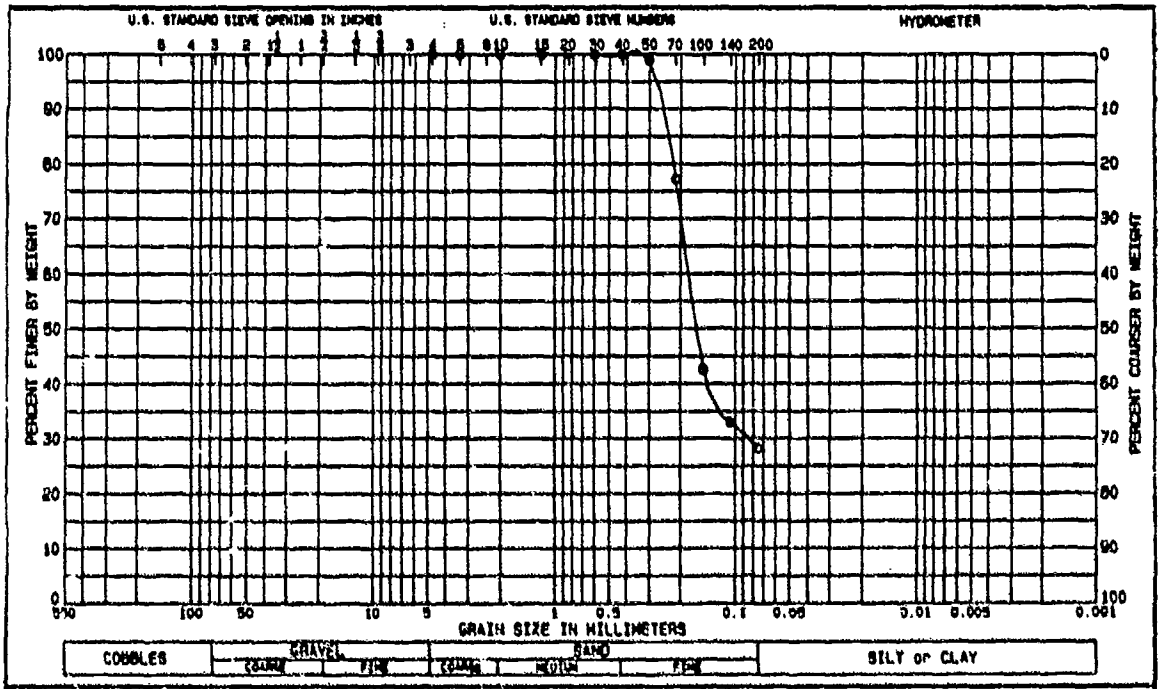
CLASSIFICATION
SILTY SAND (SM) BROWN

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-2 SAMPLE NO. 5

DEPTH/ELEV 7.5-8.0 DATE 04 AUG 88



LL	PL	PI	GS	NAT M, %	

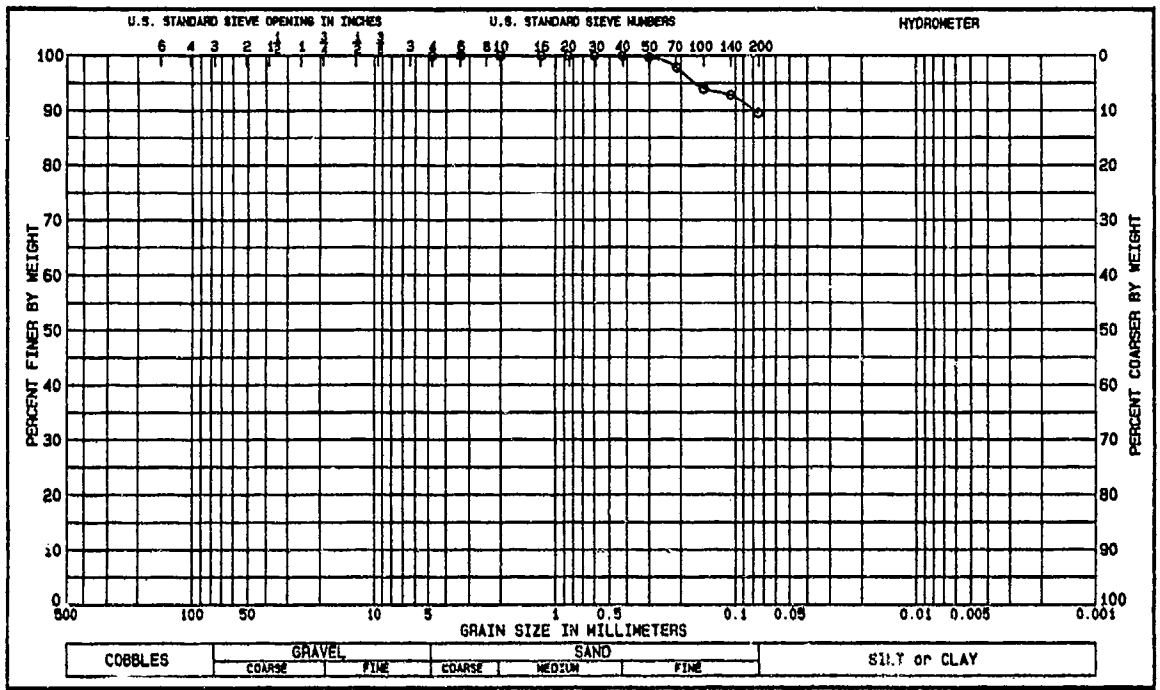
CLASSIFICATION
CLAYEY SAND (SC) BROWN

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-2 SAMPLE NO. 6

DEPTH/ELEV 9.5-10.0 DATE 04 AUG 88



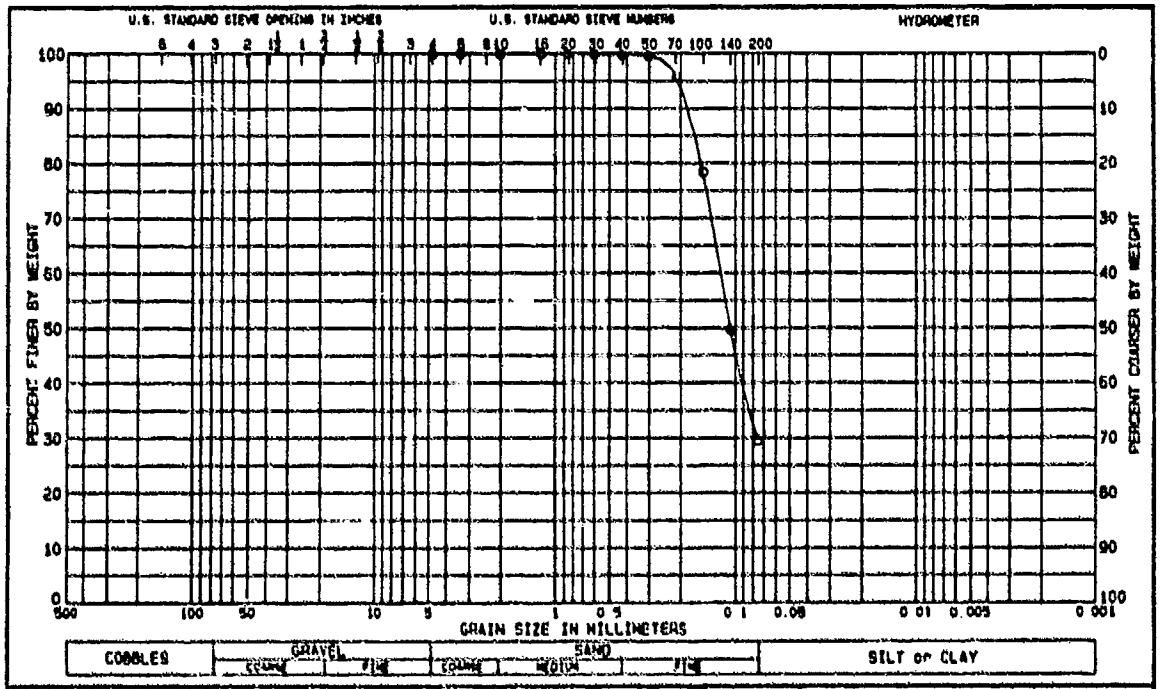
LL	PL	PI	GS	NAT W. %

CLASSIFICATION
CLAY (CL) GRAY, WITH SAND

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-2 SAMPLE NO. 7
DEPTH/ELEV 13.5-14.0 DATE 04 AUG 88



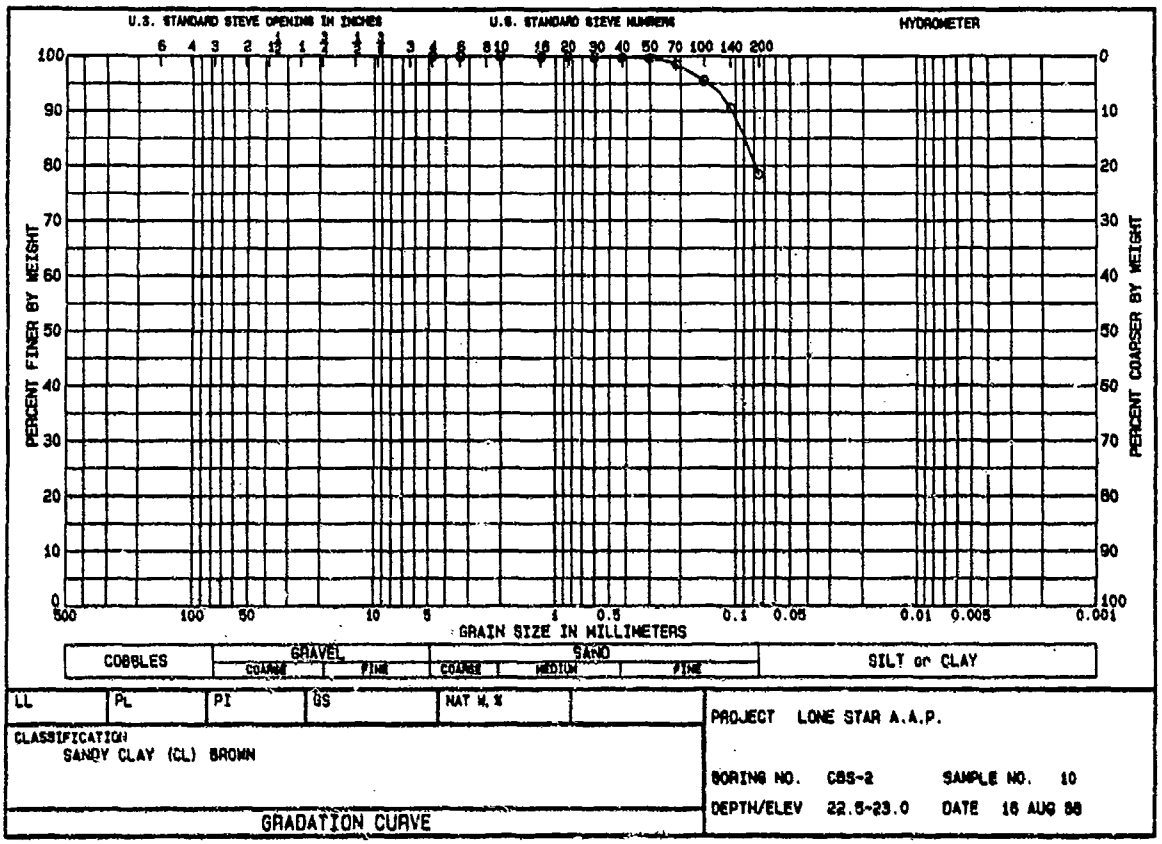
LL	PL	PI	GS	NAT W. %

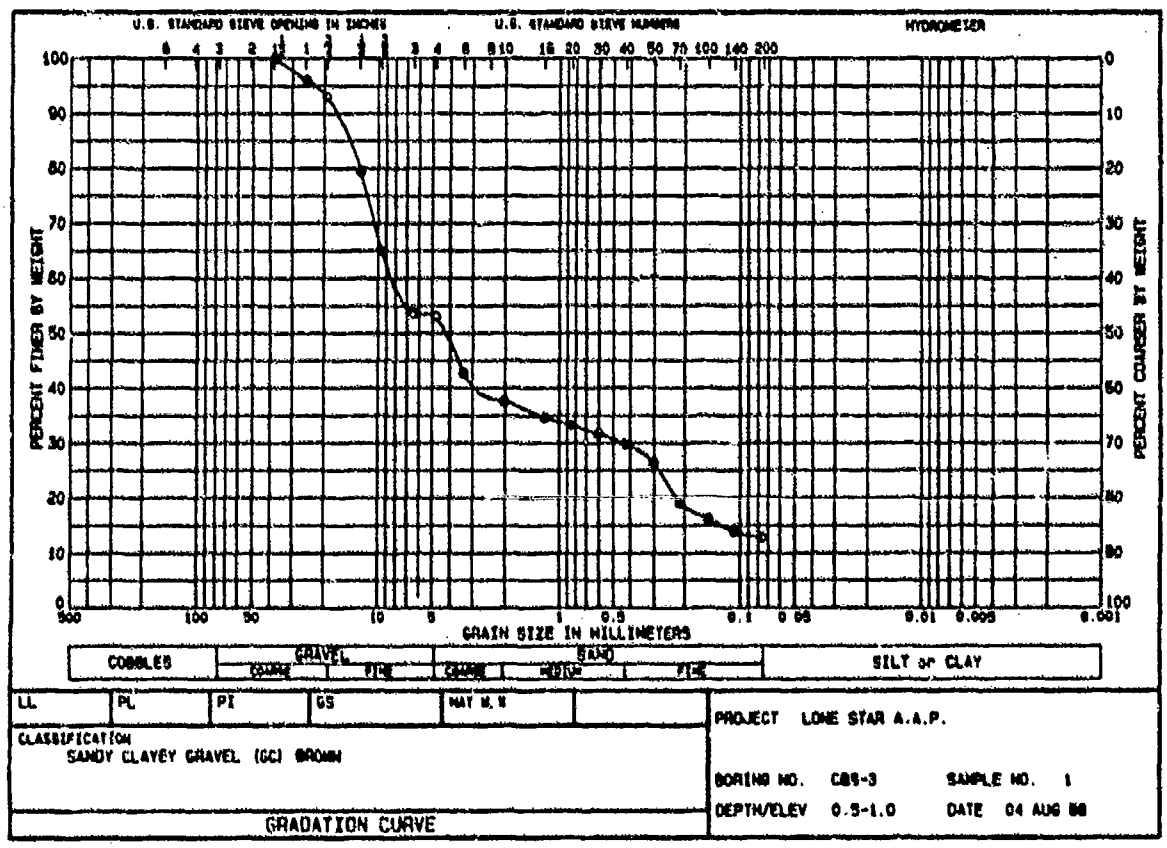
CLASSIFICATION
CLAYEY SAND (SC) BROWN

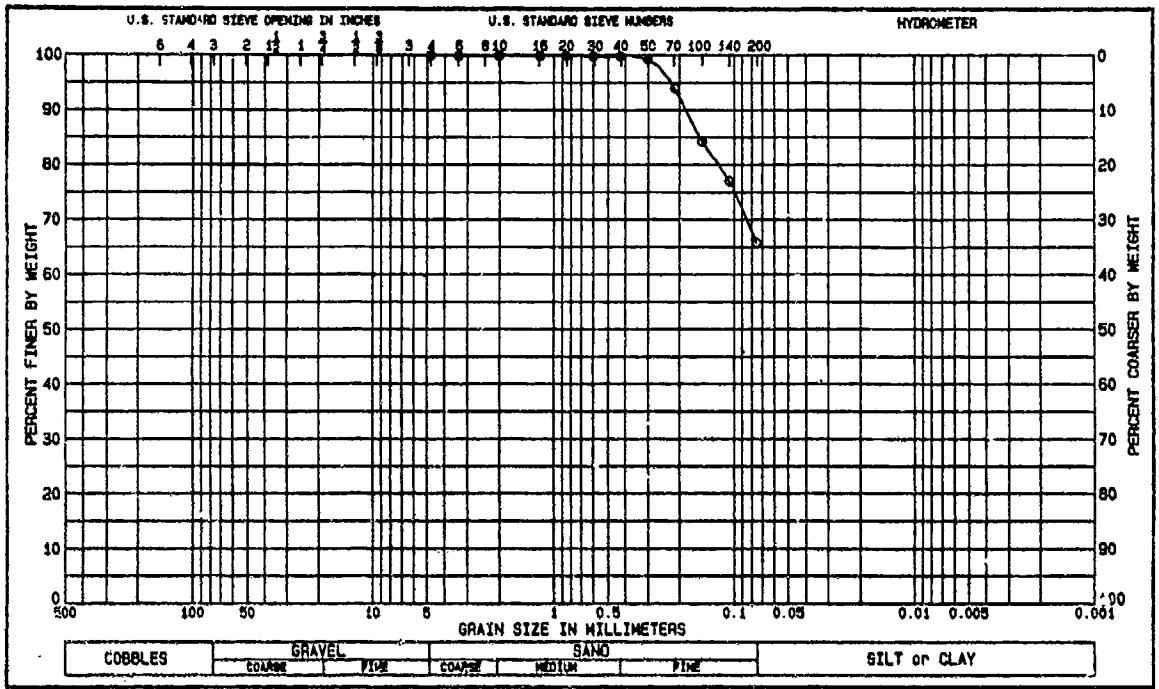
GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-2 SAMPLE NO. 9
DEPTH/ELEV 16.5-18.0 DATE 04 AUG 88


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
SAND
SILT or CLAY
LL
PL
PI
GS
NAT M, %
CLASSIFICATION
SANDY CLAY (CL) BROWN
GRADATION CURVE
PROJECT LONE STAR A.A.P.
BORING NO. CBS-2
SAMPLE NO. 10
DEPTH/ELEV 22.5-23.0
DATE 16 AUG 88


U.S. STANDARD SIEVE OPENING IN INCHES
U.S. STANDARD SIEVE NUMBERS
HYDROMETER
PERCENT FINER BY WEIGHT
PERCENT COARSER BY WEIGHT
GRAIN SIZE IN MILLIMETERS
COBBLES
GRAVEL
SAND
SILT or CLAY
LL
PL
PI
GS
NAT M, %
CLASSIFICATION
SANDY CLAYEY GRAVEL (GC) BROWN
GRADATION CURVE
PROJECT LONE STAR A.A.P.
BORING NO. CBS-3
SAMPLE NO. 1
DEPTH/ELEV 0.5-1.0
DATE 04 AUG 88



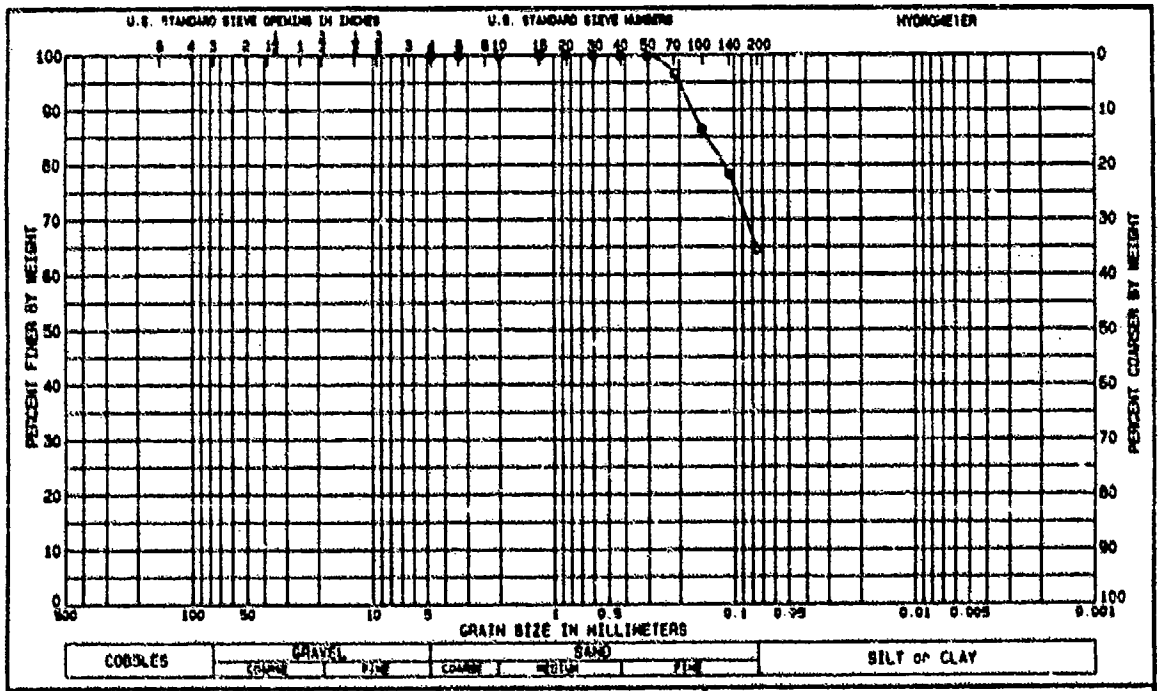
LL	PL	PI	GS	NAT M. %	

CLASSIFICATION
SANDY CLAY (CL) BROWN

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-3 SAMPLE NO. 5
DEPTH/ELEV 6.5-7.0 DATE 04 AUG 88



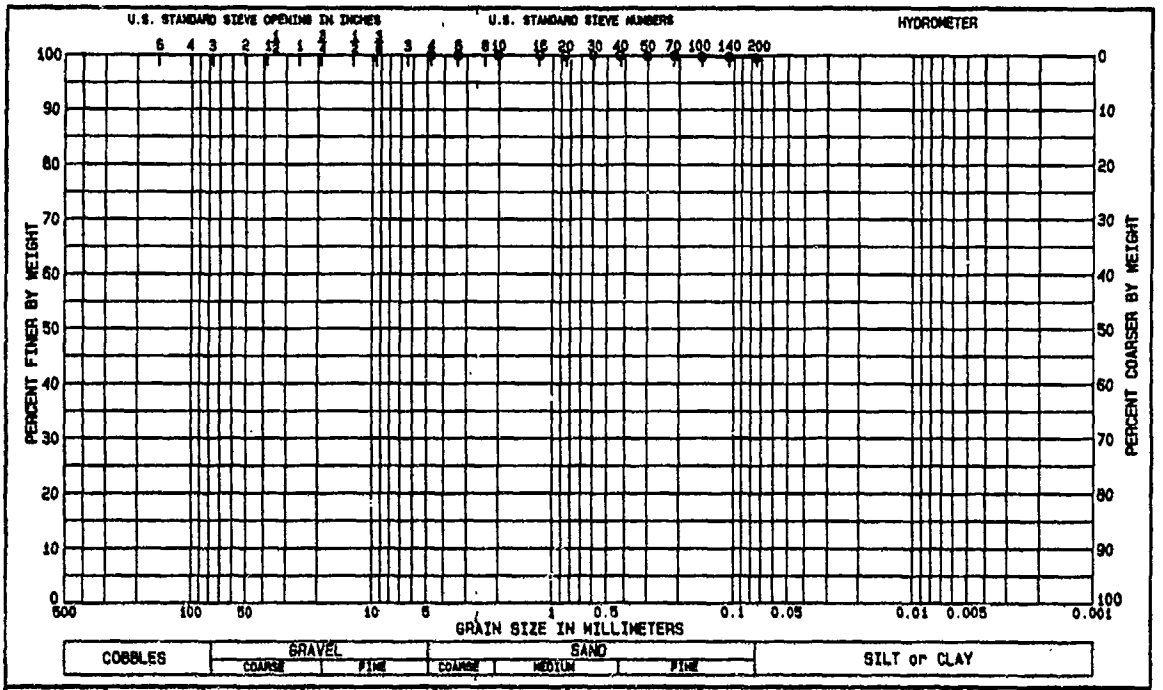
LL	PL	PI	GS	NAT M. %	

CLASSIFICATION
SANDY CLAY (CL) GRAY

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-3 SAMPLE NO. 6
DEPTH/ELEV 9.5-10.0 DATE 04 AUG 88



LL	PL	PI	GS	NAT M, %	

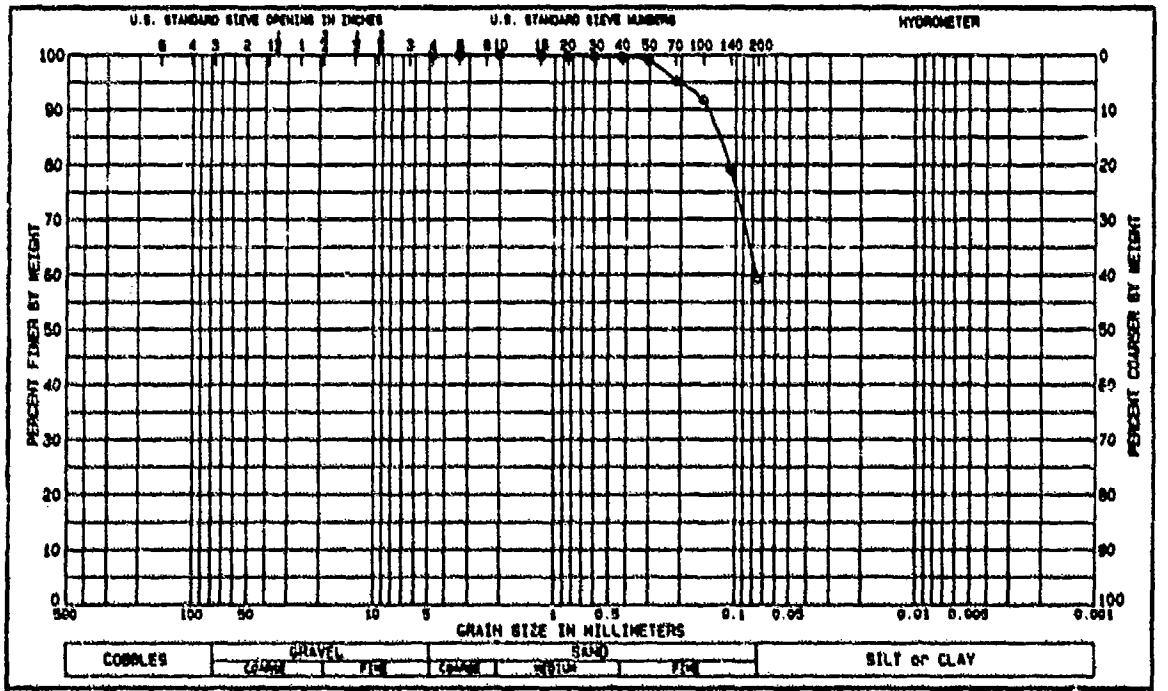
CLASSIFICATION
CLAY (CL) GRAY

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-3 SAMPLE NO. 7

DEPTH/ELEV 15.5-16.0 DATE 04 AUG 88



LL	PL	PI	GS	NAT M, %	

CLASSIFICATION
SANDY CLAY (CL) GRAY

GRADATION CURVE

PROJECT LONE STAR A.A.P.

BORING NO. CBS-3 SAMPLE NO. 10

DEPTH/ELEV 27.5-28.0 DATE 04 AUG 88

APPENDIX C

GROUND-WATER CHEMICAL RESULTS

Table C1. Analytical Results of Well CBS-1 Samples of 1988

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL *	CONCENTRATION	UNITS MEAS	INT STD *
07/12/88	ES	HG	SB01	19.4	LT	.2430	UGL	
		PB	SD09			26.3000	UGL	
		AG	SS01		LT	13.5000	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXM			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R

* Abbreviations explained at end of table.

Table C1. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	PCB125		19.4	ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		BE	99		LT	3.4000	UGL	
		NI			LT	34.4000	UGL	
		SB			LT	39.2000	UGL	
		SE			LT	74.6000	UGL	
		TL			LT	81.4000	UGL	

Table C1. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	AS	A8A	19.4	LT	3.0700	UGL	
		HG	SB01		LT	.5000	UGL	G
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXM			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFS04			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	8.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R

Table C1. (Concluded)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	PCB126		19.4	ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		SO4	X8		LT	10000.0000	UGL	
		BE	99		LT	2.3000	UGL	
		NI			LT	16.0000	UGL	
		SB			LT	59.0000	UGL	
		SE			LT	133.0000	UGL	
		TL			LT	174.0000	UGL	

Abbreviations:

ND, not detected; LT, less than indicated concentration; BOOL, Boolean field; and R, concentration based on internal standard

Table C2. Analytical Results of Well CBS-2 Samples of 1988

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	HG	SB01	14.8	LT	.2430	UGL	
		PB	SD09		LT	22.2000	UGL	
		AG	SS01		LT	13.5000	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXN			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFS04			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R

Table C2. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	PCB124		14.8	ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		BE	99		LT	3.4000	UGL	
		NI			LT	34.4000	UGL	
		SB			LT	39.2000	UGL	
		SE			LT	74.6000	UGL	
		TL			LT	81.4000	UGL	

Table C2. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	AS	A8A	14.8	LT	3.0700	UGL	
		HG	SB01		LT	.5000	UGL	G
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXN			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	9.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFS04			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R

Table C2. (Concluded)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	PCB126		14.8	ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		SO4	X8		LT	10000.0000	UGL	
		BE	99		LT	2.3000	UGL	
		NI			LT	16.0000	UGL	
		SB			LT	59.0000	UGL	
		SE			LT	133.0000	UGL	
		TL			LT	174.0000	UGL	

Table C3. Analytical Results of Well CBS-3 Samples of 1988

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	HG	SB01	27.0	LT	.2430	UGL	
		PB	SD09		LT	22.2000	UGL	
		AG	SS01		LT	13.5000	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXM			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP				25.5000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	5.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.0000	UGL	R
		FANT			LT	3.0000	UGL	
		FLRENE			LT	3.5000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	6.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R

Table C3. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	PCB125		27.0	ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NAN.L			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		BE	99		LT	3.4000	UGL	
		NI			LT	34.4000	UGL	
		SB			LT	39.2000	UGL	
		SE			LT	74.6000	UGL	
		TL			LT	81.4000	UGL	

Table C3. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS QUAL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	AS	A8A	27.0	LT	3.0700	UGL	
		HG	SB01		LT	.5000	UGL	G
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXM			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.5000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	

Table C3. (Concluded)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	NNDMEA		27.0	ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.5000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		SO4	X8		LT	10000.0000	UGL	
		BE	99		LT	2.3000	UGL	
		NI			LT	16.0000	UGL	
		SB			LT	59.0000	UGL	
		SE			LT	133.0000	UGL	
		TL			LT	174.0000	UGL	

Table C4. Analytical Results of Well 24 Samples of 1988

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	AS	A8A	35.6	LT	3.0700	UGL	
		AS			LT	3.0700	UGL	
		AS			LT	3.0700	UGL	
		HG	SB01		LT	.2430	UGL	
		PB	SD09			30.1000	UGL	
		AG	SS01		LT	13.5000	UGL	
		CD			LT	5.1600	UGL	
		CD			LT	5.1600	UGL	
		CD			LT	5.1600	UGL	
		CR				14.9000	UGL	
		CR				14.9000	UGL	
		CR				14.9000	UGL	
		CU				18.8000	UGL	
		CU				18.8000	UGL	
		CU				18.8000	UGL	
		ZN				32.5000	UGL	
		ZN				32.5000	UGL	
		ZN				32.5000	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT				.9800	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXM			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP				5.0900	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	16.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	

Table C4. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	HPCL		35.6	ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		BE	99		LT	3.4000	UGL	
		NI			LT	34.4000	UGL	
		SB			LT	39.2000	UGL	
		SE			LT	74.6000	UGL	
		TL			LT	81.4000	UGL	

Table C4. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	AS	A8A	35.6	LT	3.0700	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXM			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R

Table C4. (Concluded)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	PCP		35.6	LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2NP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4NP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		SO4	X8		LT	10000.0000	UGL	
		BE	99		LT	2.3000	UGL	
		NI			LT	16.0000	UGL	
		SB			LT	59.0000	UGL	
		SE			LT	133.0000	UGL	
		TL			LT	174.0000	UGL	

Table C5. Analytical Results of Well 25 Samples of 1988

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	AS	A8A	17.0	LT	3.0700	UGL	
		AS			LT	3.0700	UGL	
		AS			LT	3.0700	UGL	
		HG	SB01		LT	.2430	UGL	
		PB	SD09		LT	22.2000	UGL	
		AG	SS01		LT	13.5000	UGL	
		CD			LT	5.1600	UGL	
		CD			LT	5.1600	UGL	
		CD			LT	5.1600	UGL	
		CR			LT	5.9600	UGL	
		CR			LT	5.9600	UGL	
		CR			LT	5.9600	UGL	
		CU				14.7000	UGL	
		CU				14.7000	UGL	
		CU				14.7000	UGL	
		ZN			LT	20.1000	UGL	
		ZN			LT	20.1000	UGL	
		ZN			LT	20.1000	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		B2ALC			LT	.7200	UGL	
		B2CEXN			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP				6.1800	UGL	
		CHRY			LT	2.4000	UGL	
		CL6B2			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DNP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	

Table C5. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	HPCL		17.0	ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	36.0000	UGL	R
		PCB126			ND	36.0000	UGL	R
		PCP			LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	3.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.9000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		BE	99		LT	3.4000	UGL	
		NI			LT	34.4000	UGL	
		SB			LT	39.2000	UGL	
		SE			LT	74.6000	UGL	
		TL			LT	81.4000	UGL	

Table C5. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	AS	ABA	17.0	LT	3.0700	UGL	
		ABHC	UM18		ND	4.0000	UGL	R
		ACHLOR			ND	5.1000	UGL	R
		AENSLF			ND	9.2000	UGL	R
		ALDRN			ND	4.7000	UGL	R
		ANAPNE			LT	1.7000	UGL	
		ANAPYL			LT	.5000	UGL	
		ANTRC			LT	.5000	UGL	
		BAANTR			LT	1.6000	UGL	
		BAPYR			LT	4.7000	UGL	
		BBFANT			LT	5.4000	UGL	
		BBHC			ND	4.0000	UGL	R
		BBZP			LT	3.4000	UGL	
		BENSLF			ND	9.2000	UGL	R
		BENZID			ND	10.0000	UGL	R
		BENZOA			LT	13.0000	UGL	
		BGHIPY			LT	6.1000	UGL	
		BKFANT			LT	.8700	UGL	
		BZALC			LT	.7200	UGL	
		B2CEXN			LT	1.5000	UGL	
		B2CIPE			LT	5.3000	UGL	
		B2CLEE			LT	1.9000	UGL	
		B2EHP			LT	4.8000	UGL	
		CHRY			LT	2.4000	UGL	
		CL6BZ			LT	1.6000	UGL	
		CL6CP			LT	8.6000	UGL	
		CL6ET			LT	1.5000	UGL	
		DBAHA			LT	6.5000	UGL	
		DBHC			ND	4.0000	UGL	R
		DBZFUR			LT	1.7000	UGL	
		DEP			LT	2.0000	UGL	
		DLDRN			ND	4.7000	UGL	R
		DMP			LT	1.5000	UGL	
		DNBP			LT	3.7000	UGL	
		DNOP			LT	15.0000	UGL	
		ENDRN			ND	7.6000	UGL	R
		ENDRNA			ND	8.0000	UGL	R
		ENDRNK			ND	8.0000	UGL	R
		ESFSO4			ND	9.2000	UGL	R
		FANT			LT	3.3000	UGL	
		FLRENE			LT	3.7000	UGL	
		GCHLOR			ND	5.1000	UGL	R
		HCBD			LT	3.4000	UGL	
		HPCL			ND	2.0000	UGL	R
		HPCLE			ND	5.0000	UGL	R
		ICDPYR			LT	8.6000	UGL	
		ISOPHR			LT	4.8000	UGL	
		LIN			ND	4.0000	UGL	R
		MEXCLR			ND	5.1000	UGL	R
		NAP			LT	.5000	UGL	
		NB			LT	.5000	UGL	
		NNDMEA			ND	2.0000	UGL	R
		NNDNPA			LT	4.4000	UGL	
		NNDPA			LT	3.0000	UGL	
		PCB101			ND	21.0000	UGL	R
		PCB122			ND	21.0000	UGL	R
		PCB123			ND	21.0000	UGL	R
		PCB124			ND	30.0000	UGL	R
		PCB125			ND	30.0000	UGL	R
		PCB126			ND	30.0000	UGL	R

Table C5. (Concluded)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	PCP		17.0	LT	18.0000	UGL	
		PHANTR			LT	.5000	UGL	
		PHENOL			LT	9.2000	UGL	
		PPDDD			ND	4.0000	UGL	R
		PPDDE			ND	4.7000	UGL	R
		PPDDT			ND	9.2000	UGL	R
		PYR			LT	2.8000	UGL	
		TXPHEN			ND	36.0000	UGL	R
		12DCLB			LT	1.7000	UGL	
		12DPH			ND	2.0000	UGL	R
		124TCB			LT	1.8000	UGL	
		13DCLB			LT	1.7000	UGL	
		14DCLB			LT	1.7000	UGL	
		2CLP			LT	.9900	UGL	
		2CNAP			LT	.5000	UGL	
		2MNAP			LT	1.7000	UGL	
		2MP			LT	3.9000	UGL	
		2NANIL			LT	4.3000	UGL	
		2NP			LT	3.7000	UGL	
		24DCLP			LT	2.9000	UGL	
		24DMPN			LT	5.8000	UGL	
		24DNP			LT	21.0000	UGL	
		24DNT			LT	4.5000	UGL	
		245TCP			LT	5.2000	UGL	
		246TCP			LT	4.2000	UGL	
		26DNT			LT	.7900	UGL	
		3NANIL			LT	4.9000	UGL	
		33DCBD			LT	12.0000	UGL	
		4BRPPE			LT	4.2000	UGL	
		4CANIL			LT	7.3000	UGL	
		4CLPPE			LT	5.1000	UGL	
		4CL3C			LT	4.0000	UGL	
		4MP			LT	.5200	UGL	
		4NANIL			LT	5.2000	UGL	
		4NP			LT	12.0000	UGL	
		46DN2C			LT	17.0000	UGL	
		SO4	X8		LT	10000.0000	UGL	
		BE	99		LT	2.3000	UGL	
		NI			LT	16.0000	UGL	
		SB			LT	59.0000	UGL	
		SE			LT	133.0000	UGL	
		TL			LT	174.0000	UGL	

Table C6. Analytical Results of Blank Samples of 1988

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	AS	A8A	.0	LT	3.0700	UGL	
		AS		.0	LT	3.0700	UGL	
		AS		.0	LT	3.0700	UGL	
		HG	SB01	.0	LT	.2430	UGL	
		PB	SD09	.0	LT	22.2000	UGL	
		AG	SS01	.0	LT	13.5000	UGL	
		CD		.0	LT	5.1600	UGL	
		CD		.0	LT	5.1600	UGL	
		CD		.0	LT	5.1600	UGL	
		CR		.0	LT	5.9600	UGL	
		CR		.0	LT	5.9600	UGL	
		CR		.0	LT	5.9600	UGL	
		CU		.0	LT	7.9300	UGL	
		CU		.0	LT	7.9300	UGL	
		CU		.0	LT	7.9300	UGL	
		ZN		.0	LT	20.1000	UGL	
		ZN		.0	LT	20.1000	UGL	
		ZN		.0	LT	20.1000	UGL	
		ABHC	UM18	.0	ND	4.0000	UGL	R
		ACHLOR		.0	ND	5.1000	UGL	R
		AENSLF		.0	ND	9.2000	UGL	R
		ALDRN		.0	ND	4.7000	UGL	R
		ANAPNE		.0	LT	1.7000	UGL	
		ANAPYL		.0	LT	.5000	UGL	
		ANTRC		.0	LT	.5000	UGL	
		BAANTR		.0	LT	1.6000	UGL	
		BAPYR		.0	LT	4.7000	UGL	
		BBFANT		.0	LT	5.4000	UGL	
		BBHC		.0	ND	4.0000	UGL	R
		BBZP		.0	LT	3.4000	UGL	
		BENSLF		.0	ND	9.2000	UGL	R
		BENZID		.0	ND	10.0000	UGL	R
		BENZOA		.0	LT	13.0000	UGL	
		BGHIPY		.0	LT	6.1000	UGL	
		BKFANT		.0	LT	.8700	UGL	
		BZALC		.0	LT	.7200	UGL	
		B2CEXM		.0	LT	1.5000	UGL	
		B2CIPE		.0	LT	5.3000	UGL	
		B2CLEE		.0	LT	1.9000	UGL	
		B2EHP		.0		5.2700	UGL	
		CHRY		.0	LT	2.4000	UGL	
		CL6BZ		.0	LT	1.6000	UGL	
		CL6CP		.0	LT	8.6000	UGL	
		CL6ET		.0	LT	1.5000	UGL	
		DBAHA		.0	LT	6.5000	UGL	
		DBHC		.0	ND	4.0000	UGL	R
		DBZFUR		.0	LT	1.7000	UGL	
		DEP		.0	LT	2.0000	UGL	
		DLDRN		.0	ND	4.7000	UGL	R
		DMP		.0	LT	1.5000	UGL	
		DNBP		.0	LT	3.7000	UGL	
		DNOP		.0	LT	15.0000	UGL	
		ENDRN		.0	ND	7.6000	UGL	R
		ENDRNA		.0	ND	8.0000	UGL	R
		ENDRNK		.0	ND	8.0000	UGL	R
		ESFSO4		.0	ND	9.2000	UGL	R
		FANT		.0	LT	3.3000	UGL	
		FLRENE		.0	LT	3.7000	UGL	
		GCHLOR		.0	ND	5.1000	UGL	R

Table C6. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
07/12/88	ES	HCBD		.0	LT	3.4000	UGL	
		HPCL		.0	ND	2.0000	UGL	R
		HPCLE		.0	ND	5.0000	UGL	R
		ICDPYR		.0	LT	8.6000	UGL	
		ISOPHR		.0	LT	4.8000	UGL	
		LIN		.0	ND	4.0000	UGL	R
		MEXCLR		.0	ND	5.1000	UGL	R
		NAP		.0	LT	.5000	UGL	
		NB		.0	LT	.5000	UGL	
		NNDMEA		.0	ND	2.0000	UGL	R
		NNDNPA		.0	LT	4.4000	UGL	
		NNDPA		.0	LT	3.0000	UGL	
		PCB101		.0	ND	21.0000	UGL	R
		PCB122		.0	ND	21.0000	UGL	R
		PCB123		.0	ND	21.0000	UGL	R
		PCB124		.0	ND	30.0000	UGL	R
		PCB125		.0	ND	36.0000	UGL	R
		PCB126		.0	ND	36.0000	UGL	R
		PCP		.0	LT	18.0000	UGL	
		PHANTR		.0	LT	.5000	UGL	
		PHENOL		.0	LT	9.2000	UGL	
		PPDDD		.0	ND	4.0000	UGL	R
		PPDDE		.0	ND	4.7000	UGL	R
		PPDDT		.0	ND	9.2000	UGL	R
		PYR		.0	LT	2.8000	UGL	
		TXPHEN		.0	ND	36.0000	UGL	R
		12DCLB		.0	LT	1.7000	UGL	
		12DPH		.0	ND	2.0000	UGL	R
		124TCB		.0	LT	1.8000	UGL	
		13DCLB		.0	LT	1.7000	UGL	
		14DCLB		.0	LT	1.7000	UGL	
		2CLP		.0	LT	.9900	UGL	
		2CNAP		.0	LT	.5000	UGL	
		2MNAP		.0	LT	1.7000	UGL	
		2MP		.0	LT	3.9000	UGL	
		2NANIL		.0	LT	4.3000	UGL	
		2NP		.0	LT	3.7000	UGL	
		24DCLP		.0	LT	2.9000	UGL	
		24DMPN		.0	LT	5.8000	UGL	
		24DNP		.0	LT	21.0000	UGL	
		24DNT		.0	LT	4.5000	UGL	
		245TCP		.0	LT	5.2000	UGL	
		246TCP		.0	LT	4.2000	UGL	
		26DNT		.0	LT	.7900	UGL	
		3NANIL		.0	LT	4.9000	UGL	
		33DCBD		.0	LT	12.0000	UGL	
		4BRPPE		.0	LT	4.2000	UGL	
		4CANIL		.0	LT	7.3000	UGL	
		4CLPPE		.0	LT	5.1000	UGL	
		4CL3C		.0	LT	4.0000	UGL	
		4MP		.0	LT	.5200	UGL	
		4NANIL		.0	LT	5.2000	UGL	
		4NP		.0	LT	12.0000	UGL	
		46DN2C		.0	LT	17.0000	UGL	
		BE	99	.0	LT	3.4000	UGL	
		NI		.0	LT	34.4000	UGL	
		SB		.0	LT	39.2000	UGL	
		SE		.0	LT	74.6000	UGL	
		TL		.0	LT	81.4000	UGL	

Table C6. (Continued)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	AS	A8A	.0	LT	3.0700	UGL	
		ABHC	UM18	.0	ND	4.0000	UGL	R
		ACHLOR		.0	ND	5.1000	UGL	R
		AENSLF		.0	ND	9.2000	UGL	R
		ALDRN		.0	ND	4.7000	UGL	R
		ANAPNE		.0	LT	1.7000	UGL	
		ANAPYL		.0	LT	.5000	UGL	
		ANTRC		.0	LT	.5000	UGL	
		BAANTR		.0	LT	1.6000	UGL	
		BAPYR		.0	LT	4.7000	UGL	
		BBFANT		.0	LT	5.4000	UGL	
		BBHC		.0	ND	4.0000	UGL	R
		BBZP		.0	LT	3.4000	UGL	
		BENSLF		.0	ND	9.2000	UGL	R
		BENZID		.0	ND	10.0000	UGL	R
		BENZOA		.0	LT	13.0000	UGL	
		BGHIPY		.0	LT	6.1000	UGL	
		BKFANT		.0	LT	.8700	UGL	
		BZALC		.0	LT	.7200	UGL	
		B2CEXM		.0	LT	1.5000	UGL	
		B2CIPE		.0	LT	5.3000	UGL	
		B2CLEE		.0	LT	1.9000	UGL	
		B2EHP		.0	LT	4.8000	UGL	
		CHRY		.0	LT	2.4000	UGL	
		CL6BZ		.0	LT	1.6000	UGL	
		CL6CP		.0	LT	8.6000	UGL	
		CL6ET		.0	LT	1.5000	UGL	
		DBAHA		.0	LT	6.5000	UGL	
		DBHC		.0	ND	4.0000	UGL	R
		DBZFUR		.0	LT	1.7000	UGL	
		DEP		.0	LT	2.0000	UGL	
		DLDRN		.0	ND	4.7000	UGL	R
		DMP		.0	LT	1.5000	UGL	
		DNBP		.0	LT	3.7000	UGL	
		DNOP		.0	LT	15.0000	UGL	
		ENDRN		.0	ND	7.6000	UGL	R
		ENDRNA		.0	ND	8.0000	UGL	R
		ENDRNK		.0	ND	8.0000	UGL	R
		ESFS04		.0	ND	9.2000	UGL	R
		FANT		.0	LT	3.3000	UGL	
		FLRENE		.0	LT	3.7000	UGL	
		GCHLOR		.0	ND	5.1000	UGL	R
		HCBD		.0	LT	3.4000	UGL	
		HPCL		.0	ND	2.0000	UGL	R
		HPCLE		.0	ND	5.0000	UGL	R
		ICDPYR		.0	LT	8.6000	UGL	
		ISOPHR		.0	LT	4.8000	UGL	
		LIN		.0	ND	4.0000	UGL	R
		MEXCLR		.0	ND	5.1000	UGL	R
		NAP		.0	LT	.5000	UGL	
		NB		.0	LT	.5000	UGL	
		NNDMEA		.0	ND	2.0000	UGL	R
		NNDNPA		.0	LT	4.4000	UGL	
		NNDPA		.0	LT	3.0000	UGL	
		PCB101		.0	ND	21.0000	UGL	R
		PCB122		.0	ND	21.0000	UGL	R
		PCB123		.0	ND	21.0000	UGL	R
		PCB124		.0	ND	30.0000	UGL	R

Table C6. (Concluded)

SAMPLE DATE	LAB	NAME	METH NUMB	SAMPLE DEPTH(FT)	MEAS BOOL	CONCENTRATION	UNITS MEAS	INT STD
08/09/88	ES	PCB125		.0	ND	36.0000	UGL	R
		PCB126		.0	ND	36.0000	UGL	R
		PCP		.0	LT	18.0000	UGL	
		PHANTR		.0	LT	.5000	UGL	
		PHENOL		.0	LT	9.2000	UGL	
		PPDDD		.0	ND	4.0000	UGL	R
		PPDDE		.0	ND	4.7000	UGL	R
		PPDDT		.0	ND	9.2000	UGL	R
		PYR		.0	LT	2.8000	UGL	
		TXPHEN		.0	ND	36.0000	UGL	R
		12DCLB		.0	LT	1.7000	UGL	
		12DPH		.0	ND	2.0000	UGL	R
		124TCB		.0	LT	1.8000	UGL	
		13DCLB		.0	LT	1.7000	UGL	
		14DCLB		.0	LT	1.7000	UGL	
		2CLP		.0	LT	.9900	UGL	
		2CNAP		.0	LT	.5000	UGL	
		2MNAP		.0	LT	1.7000	UGL	
		2MP		.0	LT	3.9000	UGL	
		2NANIL		.0	LT	4.3000	UGL	
		2NP		.0	LT	3.7000	UGL	
		24DCLP		.0	LT	2.9000	UGL	
		24DMPN		.0	LT	5.8000	UGL	
		24DNP		.0	LT	21.0000	UGL	
		24DNT		.0	LT	4.5000	UGL	
		245TCP		.0	LT	5.2000	UGL	
		246TCP		.0	LT	4.2000	UGL	
		26DNT		.0	LT	.7900	UGL	
		3NANIL		.0	LT	4.9000	UGL	
		33DCBD		.0	LT	12.0000	UGL	
		4BRPPE		.0	LT	4.2000	UGL	
		4CANIL		.0	LT	7.3000	UGL	
		4CLPPE		.0	LT	5.1000	UGL	
		4CL3C		.0	LT	4.0000	UGL	
		4MP		.0	LT	.5200	UGL	
		4NANIL		.0	LT	5.2000	UGL	
		4NP		.0	LT	12.0000	UGL	
		46DN2C		.0	LT	17.0000	UGL	
		SO4	X8	.0	LT	10000.0000	UGL	
		BE	99	.0	LT	2.3000	UGL	
		NI		.0	LT	16.0000	UGL	
		SB		.0	LT	59.0000	UGL	
		SE		.0	LT	133.0000	UGL	
		TL		.0	LT	174.0000	UGL	

Table C7. Analytical Results for Well 25 Samples of September 1982.

PROJECT : USATHAMA Contamination Survey, Lone Star Army Ammunition Plant

CLIENT : Day and Zimmermann, Inc. JCB NO. 870

SAMPLE : #25 Groundwater SAMPLE DATE: 22 September 1982

SAMPLE TECHNIQUE : Bailer

SAMPLE LOCATION : E. of Old Chemical Burial Site

ANALYTICAL CATEGORY	ANALYTE	CONCENTRATION ppb, unless otherwise indicated
1	1,3 Dinitrobenzene (1,3 DNB)	< 1.68
	2,4,6-Trinitrotoluene (2,4,6 TNT)	< 1.86
	1,3,5-Trinitrobenzene (1,3,5 TNB)	< 1.80
	2,4-Dinitrotoluene (2,4 DNT)	< .69
	Cyclotrimethylenetrinitramine (RDX)	< 3.1
	2,4,6-Trinitrophenylmethylnitramine (Tetryl)	< 1.34
	2,6-Dinitrotoluene (2,6 DNT)	< 1.19
2	Nitrates (ppm)	.5
	Nitrites (ppm)	< .25
	Phosphates (ppm)	< .175
	Sulfates (ppm)	2.24
	Chloride (ppm)	3.68
	Fluoride (ppm)	< .50
	Chromate (ppm)	< .5
	Thiocyanate (ppm)	< .5
3	Mercury	< 1.3
	Lead	34.3
	Chromium	168.0
	Cadmium	1.64
	Copper (ppm)	.03
	Zinc (ppm)	.32
	Antimony	< 50
	Arsenic	< 6
	Beryllium (ppm)	< .01
	Nickel (ppm)	.03
	Selenium	< 20
	Silver (ppm)	< .01
	Thallium (ppm)	< .05
4	GC/MS Volatiles	
	Pentachlorophenol	N/D
	Cyclohexanol	N/D
	Cyclohexanone	N/D
	Dibutylphthalate	N/D
	Diethylphthalate	N/D
	Nitrobenzene	N/D
	Benzene Propanoic Acid	N/D
	Chloroform	N/D
	1,2-Benzene Dicarboxylic Acid (Dioctyl Ester)	N/D
	1,2,-Benzene Dicarboxylic Acid (Dibutyl Ester)	N/D
	Heptanoic Acid	N/D
	Phosphoric Acid	N/D
	1,2-Dichlorophenol	N/D
	Dichloromethane	N/D
	1,2,3-Trichloro Propane	N/D
	1,3-Dichloro, 2-Propane	N/D
	Pentanoic Acid	N/D
	Benzoic Acid	N/D
	1,2-Dicarboxylic Acid	N/D
	3,3,4,4-Tetramethyl Hexane	N/D
	2,2-Oxy-Bis Ethanol	N/D
	4-Ethyl, 2-Octane	N/D
	2-Nondacanone	N/D
	Ethyl Benzene	N/D
	2-Methyl,3-Hexane	N/D
	3,4,5-Trimethyl-2-Hexane	N/D
	Bromo Ethane	N/D

Table C7. (Concluded)

ANALYTICAL CATEGORY	ANALYTE	CONCENTRATION ppb, unless otherwise indicated
4 (Cont.)	GC/MS Acid Fraction	
	Pentachlorophenol	N/D
	Cyclohexanol	N/D
	Cyclohexanone	N/D
	Dibutylphthalate	N/D
	Diethylphthalate	N/D
	Nitrobenzene	N/D
	Benzene Propanoic Acid	N/D
	Chloroform	N/D
	1,2-Benzene Dicarboxylic Acid (Dioctyl Ester)	N/D
	1,2-Benzene Dicarboxylic Acid (Dibutyl Ester)	N/D
	Heptanoic Acid	N/D
	Phosphoric Acid	N/D
	1,2-Dichlorophenol	N/D
	Dichloromethane	N/D
	1,2,3-Trichloro Propane	N/D
	1,3-Dichloro, 2-Propane	N/D
	Pentanoic Acid	N/D
	Benzoic Acid	N/D
	1,2-Dicarboxylic Acid	N/D
	3,3,4,4-Tetramethyl Hexane	N/D
	2,2-Oxy-Bis Ethanol	N/D
	4-Ethyl, 2-Octane	N/D
	2-Nondecanone	N/D
	Ethyl Benzene	N/D
	2-Methyl, 3-Hexane	N/D
	3,4,5-Trimethyl-1-Hexane	N/D
	Bromo Ethane	N/D
	GC/MS Base/Neutral	
	Pentachlorophenol	N/D
	Cyclohexanol	N/D
	Cyclohexanone	N/D
	Dibutylphthalate	N/D
	Diethylphthalate	N/D
	Nitrobenzene	N/D
	Benzene Propanoic Acid	N/D
	Chloroform	N/D
	1,2-Benzene Dicarboxylic Acid (Dioctyl Ester)	N/D
	1,2-Benzene Dicarboxylic Acid (Dibutyl Ester)	N/D
	Heptanoic Acid	N/D
	Phosphoric Acid	N/D
	1,2-Dichlorophenol	N/D
	Dichloromethane	N/D
	1,2,3-Trichloro Propane	N/D
	1,3-Dichloro, 2-Propane	N/D
	Pentanoic Acid	N/D
	Benzoic Acid	N/D
	1,2-Dicarboxylic Acid	N/D
	3,3,4,4-Tetramethyl Hexane	N/D
	2,2-Oxy-Bis Ethanol	N/D
	4-Ethyl, 2-Octane	N/D
	2-Nondecanone	N/D
	Ethyl Benzene	N/D
	2-Methyl,3-Hexane	N/D
	3,4,5-Trimethyl-1-Hexane	N/D
	Bromo: Ethane	N/D
6	p,p',DDT	N/D
	p,p',DDE	N/D
	Dieldrin	N/D
	Alpha BHC	N/D
	Beta BHC	N/D
	Heptachlor	N/D
	Lindane	N/D
	Toxphene	N/D
	PCB 1016	N/D
	PCB 1260	N/D

Table C8. Semiannual Monitoring Results for Well 24.

WELL #: 24 DATE: 84/10/18

Cr:	0.14	Ba:	
Pb:	0.16	NO2/NO3:	
Hg:	.0007	PURGEABLES:	
Hex Cr:	<.01 (Dissolv)	pH:	6.4
TNT:		pH:	6.4
RDX:		pH:	6.3
2,4 DNT:		pH:	6.0
2,6 DNT:		CONDUCT:	
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	19 C	CONDUCT:	
TD OF WELL :	42.3	Cd:	
Na:		Se:	

WELL #: 24 DATE: 85/05/22

Cr:	.003 (Dissolv) .064 (Total)	Ba:	
Pb:	.004 (Dissolv) .056 (Total)	NO2/NO3:	
Hg:	.0002 (Dissolv) .0009 (Total)	PURGEABLES:	
Hex Cr:	<.01	pH:	6.0
TNT:		pH:	6.0
RDX:		pH:	6.0
2,4 DNT:		pH:	6.0
2,6 DNT:		CONDUCT:	
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	18 C	CONDUCT:	
TD OF WELL :	42.3	Cd:	
Na:		Se:	

WELL #: 24 DATE: 85/11/25

Cr:		Ba:	.01
Pb:		NO2/NO3:	
Hg:		PURGEABLES:	
Hex Cr:		pH:	6.4
TNT:		pH:	6.4
RDX:		pH:	6.4
2,4 DNT:		pH:	6.4
2,6 DNT:		CONDUCT:	7000
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	17 C	CONDUCT:	
TD OF WELL :	42.3	Cd:	
Na:	10.8	Se:	

WELL #: 24 DATE: 86/04/03

Cr:	<0.001	Ba:	
Pb:	0.004	NO2/NO3:	
Hg:	.0215	PURGEABLES:	
Hex Cr:	<.01	pH:	6.1
TNT:	<.05	pH:	6.1
RDX:	<.05	pH:	6.1
2,4 DNT:		pH:	6.0
2,6 DNT:		CONDUCT:	
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	16 C	CONDUCT:	
TD OF WELL :	42.3	Cd:	
Na:		Se:	

Table C8. (Concluded)

WELL #: 24 DATE: 86/09/25

Cr:	<0.010	Ba:	
Pb:	0.013	NO2/NO3:	.02/.15
Hg:	<.0005 mg/l	PURGEABLES:	.02
Hex Cr:	<0.01	pH:	6.1
TNT:	<.05	pH:	6.0
RDX:	<.05	pH:	6.1
2,4 DNT:	<0.005	pH:	6.2
2,6 DNT:	<0.005	CONDUCT:	
TETRYL:	<0.1	CONDUCT:	
HMX:	<0.1	CONDUCT:	
TEMP:	18 C	CONDUCT:	
TD OF WELL :	42.3	Cd:	
Na:		Se:	

WELL #: 24 DATE: 87/04/07

Cr:	0.003	Ba:	
Pb:	0.004	NO2/NO3:	
Hg:	<.0005	PURGEABLES:	
Hex Cr:	<0.01	pH:	6.9
TNT:	<.05	pH:	7.0
RDX:	<.05	pH:	7.0
2,4 DNT:	<.05	pH:	7.0
2,6 DNT:	<.05	CONDUCT:	4500
TETRYL:	<.05	CONDUCT:	4400
HMX:	<.1	CONDUCT:	4400
TEMP:	20 C	CONDUCT:	4450
TD OF WELL :	42.2	Cd:	
Na:		Se:	

WELL #: 24 DATE: 87/10/21

Cr:	0.004	Ba:	
Pb:	0.006	NO2/NO3:	
Hg:	<.0005	PURGEABLES:	
Hex Cr:	<0.01	pH:	4.8
TNT:		pH:	
RDX:		pH:	
2,4 DNT:		pH:	
2,6 DNT:		CONDUCT:	94
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	18.2 C	CONDUCT:	
TD OF WELL :	42.4	Cd:	
Na:		Se:	

WELL #: 24 DATE: 88/05/19

Cr:	<.05	Ba:	
Pb:	<.001	NO2/NO3:	.27
Hg:	<.0005	PURGEABLES:	
Hex Cr:	<.05	pH:	6.3
TNT:	<.1	pH:	6.2
RDX:	<.3	pH:	6.3
2,4 DNT:	<.1	pH:	6.2
2,6 DNT:	<.1	CONDUCT:	17.000
TETRYL:	<.3	CONDUCT:	17.000
HMX:	<.3	CONDUCT:	20.000
TEMP:	17.4 C	CONDUCT:	17.000
TD OF WELL :	42.2	Cd:	
Na:		Se:	

Table C9. Semiannual Monitoring Results for Well 25.

WELL #: 25 DATE: 84/10/18

Cr:	0.042	Ba:	
Pb:	0.019	NO2/NO3:	
Hg:	.0002	PURGEABLES:	
Hex Cr:	(.01 (Dissolv)	pH:	6.4
TNT:		pH:	6.4
RDX:		pH:	6.2
2,4 DNT:		pH:	6.2
2,6 DNT:		CONDUCT:	
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	20 C	CONDUCT:	
TD OF WELL :	40.4	Cd:	
Na:		Se:	

WELL #: 25 DATE: 85/05/22

Cr:	(.001 (Dissolv)	.066 (Total)	Ba:		
Pb:	.002 (Dissolv)	.116 (Total)	NO2/NO3:		
Hg:	.0002 (Dissolv)	.0006 (Total)	PURGEABLES:		
Hex Cr:	(.01		pH:	6.1	
TNT:			pH:	6.1	
RDX:			pH:	6.1	
2,4 DNT:			pH:	6.1	
2,6 DNT:			CONDUCT:		
TETRYL:			CONDUCT:		
HMX:			CONDUCT:		
TEMP:	18 C		CONDUCT:		
TD OF WELL :	40.4		Cd:		
Na:			Se:		

WELL #: 25 DATE: 85/11/22

Cr:		Ba:	.185
Pb:		NO2/NO3:	.03 (TOTAL N)
Hg:		PURGEABLES:	
Hex Cr:		pH:	6.0
TNT:		pH:	6.0
RDX:		pH:	6.0
2,4 DNT:		pH:	6.0
2,6 DNT:		CONDUCT:	6500
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	18 C	CONDUCT:	
TD OF WELL :	40.5	Cd:	.0011
Na:	30.7	Se:	

WELL #: 25 DATE: 86/04/04

Cr:	(0.001	Ba:	
Pb:	0.003	NO2/NO3:	
Hg:	.0005	PURGEABLES:	
Hex Cr:	(.10	pH:	5.9
TNT:	(.05	pH:	5.9
RDX:	(.05	pH:	6.0
2,4 DNT:		pH:	6.0
2,6 DNT:		CONDUCT:	
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	18 C	CONDUCT:	
TD OF WELL :	40.4	Cd:	
Na:		Se:	

Table C9. (Concluded)

WELL #: 25 DATE: 86/09/25

Cr:	<0.010	Ba:	
Pb:	<0.010	NO2/NO3:	<.01/.02
Hg:	<.0005 mg/l	PURGEABLES:	
Hex Cr:	<0.01	pH:	6.1
TNT:	<.05	pH:	6.0
RDX:	<.05	pH:	6.1
2,4 DNT:	<0.005	pH:	6.1
2,6 DNT:	<0.005	CONDUCT:	
TETRYL:	<0.1	CONDUCT:	
HMX:	<0.1	CONDUCT:	
TEMP:	21 C	CONDUCT:	
TD OF WELL :	40.4	Cd:	
Na:		Se:	

WELL #: 25 DATE: 87/04/08

Cr:	<0.001	Ba:	
Pb:	0.005	NO2/NO3:	
Hg:	<.0005	PURGEABLES:	
Hex Cr:	<0.01	pH:	5.9
TNT:		pH:	5.8
RDX:		pH:	6.0
2,4 DNT:		pH:	6.0
2,6 DNT:		CONDUCT:	5250
TETRYL:		CONDUCT:	5250
HMX:		CONDUCT:	5250
TEMP:	20 C	CONDUCT:	5250
TD OF WELL :	40.5	Cd:	
Na:		Se:	

WELL #: 25 DATE: 87/10/21

Cr:	0.000	Ba:	
Pb:	0.006	NO2/NO3:	
Hg:	0.0005	PURGEABLES:	
Hex Cr:	<0.01	pH:	5.5
TNT:		pH:	
RDX:		pH:	
2,4 DNT:		pH:	
2,6 DNT:		CONDUCT:	61
TETRYL:		CONDUCT:	
HMX:		CONDUCT:	
TEMP:	18.7 C	CONDUCT:	
TD OF WELL :	40.3	Cd:	
Na:		Se:	

WELL #: 25 DATE: 88/05/19

Cr:	<.05	Ba:	
Pb:	<.001	NO2/NO3:	.38
Hg:	<.0005	PURGEABLES:	
Hex Cr:	<.01	pH:	6.0
TNT:	<.1	pH:	5.9
RDX:	<.3	pH:	5.9
2,4 DNT:	<.1	pH:	5.9
2,6 DNT:	<.1	CONDUCT:	18.000
TETRYL:	<.3	CONDUCT:	18.000
HMX:	<.3	CONDUCT:	20.000
TEMP:	16.2 C	CONDUCT:	20.000
TD OF WELL :	40.4	Cd:	
Na:		Se:	